HGS Bulletin
Houston Geological Society
Volume 57, Number 3
November 2014

The Robert E. Sheriff Lecture Series
The Arctic – a Tectonic Tour Through the Last Great Petroleum Frontier

Page 21

Vintage Geology

Page 35

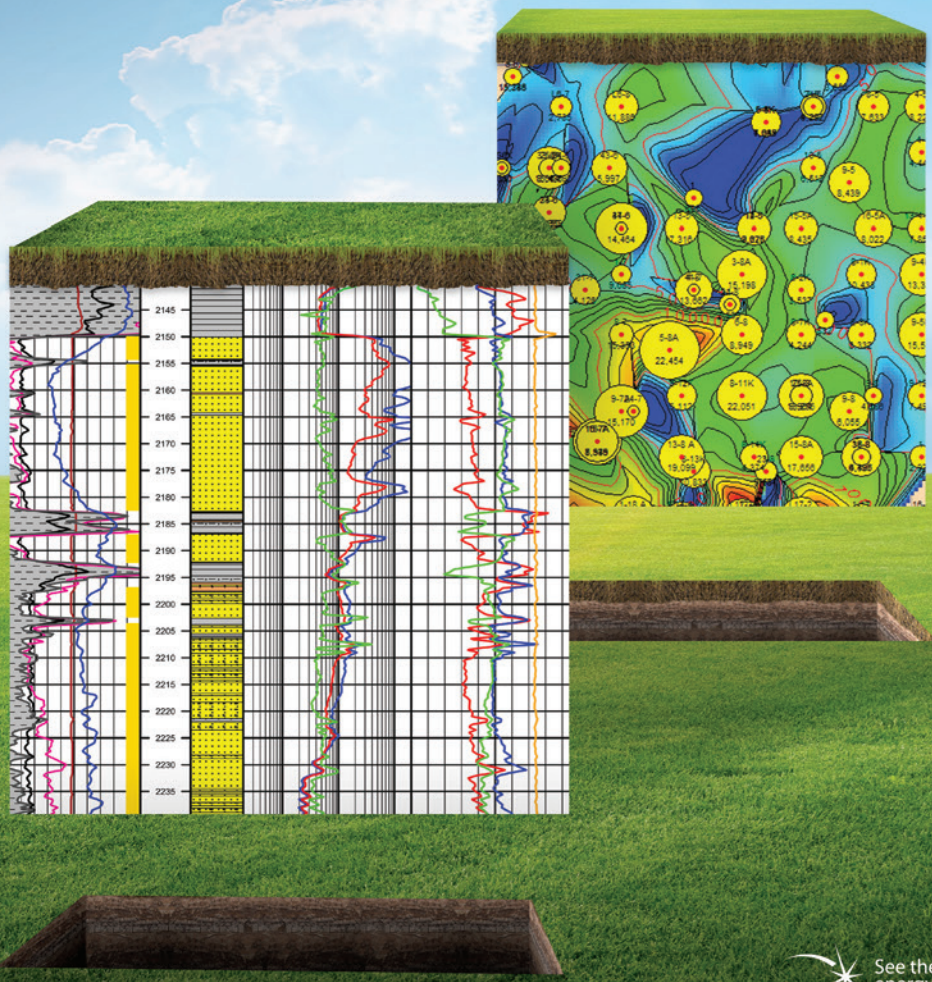
SEE THE ENERGY

U.S. SMART RASTERS AND WELL PERFORMANCE DATA

TGS offers a cost effective way for oil and gas companies to quickly identify and evaluate new prospects across the country.

- Nationwide well header/identification data for more than four million well records
- Depth-registered (smartRASTER®) log images and standard images from more than six million logs
- Detailed US production volumes for approximately 2.1 million wells
- Use of TGS Longbow™, a search and visualization tool

For more information, contact TGS at:
Tel: +1 713 860 2100
Email: info@tgs.com



WWW.TGS.COM

TGS See the energy.

The Bulletin
Houston Geological Society

Volume 57, Number 3 November 2014

In Every Issue

The Houston Geological Society Bulletin (ISSN-018-6686) is published monthly except for July and August by the Houston Geological Society, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916. Phone: 713-463-9476; fax: 281-679-5504

Editorial correspondence and material submitted for publication should be addressed to the Editor, Houston Geological Society *Bulletin*, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916 or to dwmiller.hgs@gmail.com.

Subscriptions: Subscription to this publication is included in the membership dues ($28.00 annually). Subscription price for nonmembers within the contiguous U.S. is $50.00 per year. For those outside the contiguous U.S. the subscription price is $75.00 per year. Single-copy price is $8.00. Periodicals postage paid in Houston, Texas.

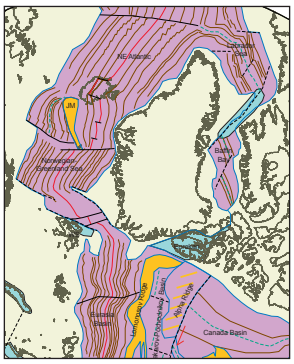
POSTMASTER: Send address changes to Houston Geological Society *Bulletin*, 14811 St. Mary's Lane, Suite 250, Houston, Texas 77079-2916

Technical Meetings

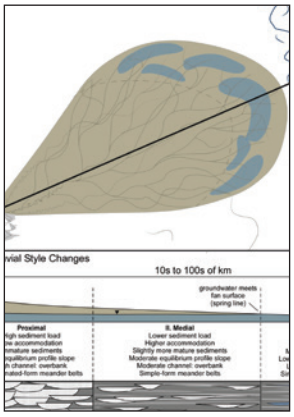
Other Features

page 11

page 17



page 21



page 25

About the Cover: Shallow stratigraphic coring off northeastern Greenland in 2008 with multiple ice breakers. The derrick ship pictured is the *Vidar Viking*. *Photograph courtesy Erik Lundin, Statoil.*

MultiClient

Triton helps your exploration team:

- Explore 10,000 sq km of data, covering 390 OCS blocks in Garden Banks and Keathley Canyon
- Identify new prospects and better image previously challenging targets
- Achieve better illumination, deeper penetration, and improved clarity

TRITON: FULL SPEED AHEAD

PGS reports strong performance of the Triton GeoStreamer® full azimuth survey in the central and western Gulf of Mexico, with over 50% of acquisition now complete.

Triton represents the next important advance in tailored acquisition design and state-of-the-art depth imaging, both of which are critical to successful exploration in the deep-water salt-prone Gulf of Mexico. The Triton survey utilizes a total of five vessels in the unique Orion™ configuration to reveal the structures obscured beneath the salt with high fold, long-offset, dual-sensor full azimuth (FAZ) seismic data.

Steven Fishburn Tel: +1 281 509 8124, gominfo@pgs.com

PGS

A Clearer Image | www.pgs.com

Board of Directors 2014–15

President (P) Ken Nemeth	Schlumberger	281-770-6410	ken.prez.hgs@gmail.com
President-Elect (PE) Deborah Sacrey	Auburn Energy	713-468-3260	dsacrey@auburnenergy.com
Vice President (VP) John Jordan	Anadarko	713-594-5648	John.Jordan@anadarko.com
Secretary (S) Ashley Garcia	ION	281-239-4576	ashley.garcia@iongeo.com
Treasurer (T) Joe Lynch	Halliburton	713 839 3657	HGS.JoeLynch@gmail.com
Treasurer Elect (TE) Larry Quandt	CoreLab	713-206-0389	lquandt777@gmail.com
Editor (E) Dave Miller	Statoil	832-447-0597	dwmiller.hgs@gmail.com
Editor-Elect (EE) Jon Blickwede	Statoil	832-228-6593	jonblickwede@gmail.com
Director 13-15 (D1) Jim Beck	Tiger Eye Resources	832-524-4112	tigereyejab@aol.com
Director 14-16 (D2) Penny Patterson	ExxonMobil	713-553-8779	Penny.E.Patterson@ExxonMobil.com
Director 14-16 (D3) Jim Grubb		713-591-1155	jamesmgrubb@yahoo.com
Director 13-15 (D4) Allen Mattis	Knowledge Reservoir	713-204-8069	afmattis@hal-pc.org

Committee	Chairperson	Phone	Email	Board Rep.
AAPG House of Delegates	John Dombrowski	832-483-7488	jdombrowski@peacerivergroupllc.com	P
Academic Liaison	vacant			D2
Advertising	Jill Kimble	713-463-9476	jill@hgs.org	E
Africa Conference	Martin Cassidy	713 503- 8331	mcassidy.hgs@gmail.com	P
Applied Geoscience Conferences	Frank Walles/ Mike Cameron	832-472-8496/ 713-496-6458	Frank.Walles@bakerhughes.com/ mcameron@hess.com	P
Arrangements (hotel contracts)	John Jordan	713-594-5648	John.Jordan@anadarko.com	VP
Awards	Mike Deming	713-503-1751	mike.deming.HGS@gmail.com	VP
Ballot/Elections	Paul Hoffman	713-871-2350	phoffman@allen-hoffman.com	S
Calvert Fund	Carl Norman	713-461-7420	dod895@aol.com	PE
Continuing Education	vacant			D1
Deep Water Technology	Justin Vandenbrink	832-205-4063	justin.vandenbrink@weatherford.com	D4
Earth Science Week	Marc Fagelman	713-869-2045/832-741-7511	marc05fagelman@gmail.com	D2
Educational Outreach	Jennifer Burton	832-607-0074	jlbgeo@comcast.net	D2
Engineering Council of Houston	Sue Pritchett	281-451-6522	pritchett.sue@gmail.com	D2
Environmental & Eng. Geology	Matthew Cowan/ Troy Meinen	713-777-0534/ 713-962-5495	mrcowan1@hal-pc.org/ troy.meinem@erm.com	VP
Exhibits	Bryan Guzman	832-270-5842	bryan.guzman85@gmail.com	D3
Field Trips	Ken Thies		kenthies.kt@gmail.com	D1
Finance	Sean Kimiagar	817-727-6424	seankimiagar@gmail.com	T
Foundation Fund	John Adamick	713-860-2114	john.adamick@tgs.com	PE
General Meetings	John Jordan	713-594-5648	John.Jordan@anadarko.com	VP
Geomechanics	Heather Davey/ Lans Taylor		heather.davey@wintershall.com/ lxtaylor@talismanusa.com	P
Golf Tournament	Mark Dennis	281-494-2522	mdennis@petrolog.com	D4
Government Affairs	Henry Wise/Arlin Howles	281-242-7190/281-753-9876	hmwise@yahoo.com/tidenv@yahoo.com	D4
GSH Liaison	Steve Earle	281-435-5020	steve.hgs@gmail.com	P
Guest Night	Dave Reynolds	281-275-7581/281-636-5178	dreynolds@fairfieldnodal.com	D4
HGS New Publications	Bill Rizer	503-852-3062	rizerwd@gmail.com	D1
Houston Energy Council	Sandi Barber	713-935-7830	sandi.barber@ihs.com	PE
HPAC	Janet Steinmetz	281-531-7204	jsrstx@yahoo.com	S
Imperial Barrel	Shawn Kushiyama	713-857-9958	shawn.kushiyama@shell.com	D2
International Explorationists	Scott Thornton	713-210-8318	sthornton@paexploration.com	VP
Legends Night	John Tubb	713-805-5649	jbtjr@sbcglobal.net	P
Membership Growth	Jeff Allen	713-871-2350	jeffallen@allen-hoffman.com	D3
Membership, New	Sharie Sartain	281-382-9855	smsartain1@comcast.net	S
Museum of Natural Science	Inda Immega	713-661-3494	immega@swbell.net	D2
NeoGeos	Sean Kimiagar	817-727-6424	seankimiagar@gmail.com	D3
Nominations	Barry J. Katz	832-854-6989	BarryKatz@chevron.com	P
North American Explorationists	Steve Getz/ Donna Davis	713-304-8503/ 281-759-8403	sgetz@sbcglobal.net/geology@texas.net	VP
Northsiders	Kyle Tschudy	832-284-1520	kyle.tschudy@waetherford.com	VP
Office Management	Christina Higginbotham	281-620-7835	christina.hgs@att.net	PE
Publication Sales	Dennis McConnell	281-362-4743	Dennis.Mcconnell@morganstanleysmithbarney.com	D1
Science and Engineering Fair	Vacant			D2
Skeet Shoot	Tom McCarroll	713-419-9414	tom_mccarroll@yahoo.com	D4
Social Media	Dianna Phu	281-236-3131/713-589-2362	hgs.socialmedia@gmail.com	D3
Tennis Tournament	Vacant			D4
Vendor's Corner	Paul Babcock	713-859-0316	PBabcock@sabineoil.com	TE
Video Committee	Linda Sternbach	281-679-7333	linda.sternbach@gmail.com	D3
Volunteer Coordinator	Lucy Plant	281-520-9920	Lucy.Plant@fei.com	P
Web Management	Sandi Barber	713-935-7830	sandi.barber@ihs.com	D3
HGS Office Director	Sandra Babcock	713-463-9476	sandra@hgs.org	

Ken Nemeth
ken.prez.hgs@gmail.com

Presidential Ponderings

It's November, time for Thanksgiving and giving thanks. I'm thankful for many things, but what if at the same time I asked you "What about you?" Not only what are you thankful for, but what about you? This month I want to look at those two questions.

What am I thankful for? There are the big and obvious things: life, family, job, health, living in America, working in the oil industry, unconventional resources, the price of oil, and those are just the more obvious items. There are some things that are also taken for granted; friends, memories, and waking up each morning.

What should you be thankful for? I suppose that depends upon whether I am asking the experienced hand or the young professional. I am going to ask the young professional because this year may be the first year that those with less than ten years' experience get to ponder the possibility of employment changes that they have not initiated. There have not been any big employment announcements for E&P companies. There is no apparent reason that one should worry. However, some layoffs have been announced in the local paper by service companies earlier this year. And in August, by word of mouth, one company reduced its exploration staff. Never having experienced that kind of trepidation can make one think harder about what they should be thankful for each day.

I bring this up because historically it has been interesting how involvement in HGS increases when layoffs occur. Membership numbers also rise. Speaking of membership, have you renewed your HGS membership for 2014-15? The HGS membership report for August showed that some 1900 members had not yet renewed their dues. If you didn't renew, October was the last time you received the *Bulletin* and you lost access to the members' only portion of the HGS web site.

So as Thanksgiving approaches I would like to remind the HGS members about what you get for $28.00 each year: a first class *Bulletin*; a vibrant web site with lots of reference material; professional development opportunities that your employer may not be aware exist; network opportunities that you may not appreciate today or that may take some time to pay dividends; the opportunity to educate your peers; the opportunity to build not only oil industry history, but also HGS history. Why is this important? HGS will turn 100 years old in August 2023!

…I would like to remind the HGS members about what you get for $28.00 each year: a first class Bulletin*; a vibrant web site with lots of reference material; professional development opportunities that your employer may not be aware exist; network opportunities that you may not appreciate today or that may take some time to pay dividends…*

How does my second question come about? I attended the International Dinner Meeting held on September 8 at the Westin Hotel. I was enjoying my conversation with my dinner companion, but realized that I was talking but – he was asking – he was learning, and I didn't know a lot about him. So I turned the tables during a small lull and asked "What about you?" Those three words were an epiphany for me and I suggest that they might open doors for you.

What a surprise!! He responded and I learned that he:

- Had a geography degree from UCLA
- Had served in the US military
- After discharge had moved to Hawaii and worked for the State as a Social Worker
- Got hired by the FBI
- Moved to Houston
- Now heads the area antiterrorist task force for West Africa in Houston
- Wanted to understand better the influence and impact the oil industry and geology have on West Africa
- Looks at these and similar professional society opportunities as a way to enhance the capabilities of the FBI to study how possible threats might develop.

From The President *continued on page 9*

Dave Miller
dwmiller.hgs@gmail.com

Thank you, Mr. Tonn and Ole

If you ask my mother, it was always obvious that I would be a geologist. According to her, from the moment I could walk I was collecting rocks. Of course, she has forgotten that I also liked to eat paste (not sure what career that would lead to) and she tends to confuse geology with archeology.

In fact, I knew nothing about geology until my junior year of high school. I was interested in biology and planned to be a marine biologist. One of the required courses in my school was Physical Geography, taught by Mr. Duane Tonn. One of the requirements for his course was that each of us create a country, complete with climate, landforms and natural resources. This exercise forced me to consider things I had previously either taken for granted or simply didn't pay attention to. For example, water didn't "spring" into existence at the tap, but had to be stored somewhere below ground. Building materials, such as sand, gravel and cement, were not created at the hardware store. The gasoline to drive the vehicles used by citizens of my newly created country was not generated at the local service station. It was while looking at each of these in more detail that I discovered a new and interesting passion – geology. I don't remember how well I did on the exercise, but I do clearly remember the moment the light went on and I found something that I could devote my life to.

Of course, she has forgotten that I also liked to eat paste (not sure what career that would lead to) and she tends to confuse geology with archeology.

After earning both a BS and an MS in geology, it was time to earn a living. I specialized in hard-rock geology and it was not at all obvious how my degrees could be used to generate an income. Through an interesting series of events, I ended up being hired by Mobil and began work in their Denver office. Here I had the opportunity to meet a man that would have a huge influence on my career. Mr. C.E. "Ole" Carlsen was a geologist who had risen high in the management ranks in Mobil. He decided that he wanted to spend more time working with young geologists and stepped down from his management position to give himself time to do this. His constant advice and encouragement, as well as his ability to "guide" a headstrong young geologist, have served me well for the past 30+ years. Ole was an advocate of taking training courses related to subjects that were outside of your discipline. He "encouraged" me to take courses in Reservoir Engineering, Well Drilling and Completion, Economics, Geochemistry and Geophysics. His belief was that you didn't have to be an expert in all fields, but that it was important to have enough knowledge of a topic to ask the right questions and to understand when you were being told things that didn't seem to make sense.

These two men, one of whom introduced me to geology and the other who taught me how to be a professional geologist, have had an incredible influence on my life and career. I try to incorporate the lessons they taught me, when advising younger colleagues and to keep the thrill of discovery and learning intact in my personal and professional lives.

Thank you, Mr. Tonn and Ole. I never expected that my life would turn out as it did and am grateful for your advice and instruction.

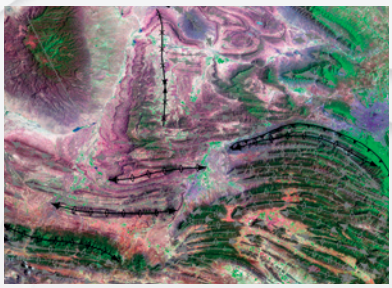
Do you have a Mr. Tonn or an Ole in your career? Tell others about them, and why not send your stories about them to the Editor of the HGS *Bulletin* for possible publication. ■

getech

New for 2014

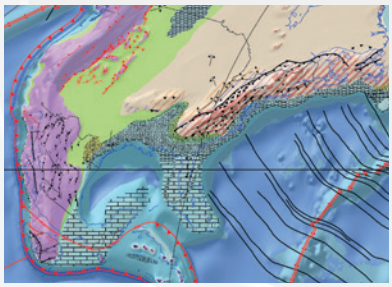
Tectonic Evolution of Mexico

New structural mapping and depth-to-basement based on unique high resolution gravity and magnetic data. *New* plate tectonic model.



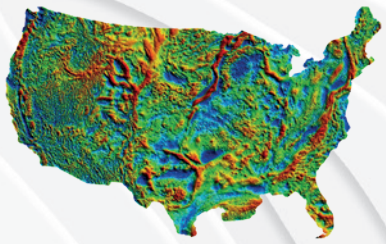
Globe: US & Mexico

Getech is pleased to announce that its flagship new ventures platform, *Globe*, is now available for the Lower 48 states of the US, Mexico and the Gulf of Mexico.



High Resolution US Gravity & Magnetic Data

The most detailed proprietary gravity database commercially available, covering all US onshore basins.



Get in touch

3000 Wilcrest Drive
Suite 155
Houston
TX 77042

+1 713 979 9900
info@getech.com
www.getech.com

From the President continued from page 5

Geology is coming to the forefront of the public interest more today than ever before. It is not limited to rocks and oil or gas. We have tsunamis, volcanoes, global warming, ice cap loss, drought and shrinking aquifers, fracing reservoir concerns, and injection well concerns. Geology the science is now more than ever becoming a public and political topic. Items that used to garner five lines on the back page of the business section now become headlines on the front page. Geology and geologists are no longer "under the radar." Amazing when you ponder all of this.

Our Vision:
To be the essential organization serving earth science professionals in the Houston community

Our Mission:
To provide earth science enrichment through technical education, networking opportunities, and community service

Our Slogan:
A local geosciences society with global reach

Let me return to my previous ponderings, what about you? What hidden talents are lying dormant? What "bucket" items might you check off by serving your professional society? Education? Education or public outreach? Event organization? Leadership? In the next ten years, HGS will need the young members of today to be the experienced members of tomorrow. Besides the conventions in 2015 and 2017 other conventions are scheduled for 2020 (GCAGS) and 2022 (AAPG). We have not even begun the planning for our 100th anniversary in August 2023. We need volunteers to step forward for our vacant committee posts. HGS needs young professionals to step forward and participate in committees and to stand for office. Without you, the young professionals, HGS cannot continue to grow and serve the community. Young professionals, NeoGeos, what about you?

My "Look Back in Time" articles showed the support of management and encouragement of young professionals to participate in local professional society activities in the fifties and sixties. I challenge today's companies to return to that time when professional society involvement was expected, not just something that was listed on a resume or vita.

The African Conference seems to have been a huge success. The short course preceding the conference had 54 attendees. The original expectation was for 30. With exhibitors and walkups, Martin Cassidy reported the overall attendance was at or near 450 people. My congratulations to the Conference Chairmen and their committee for all their efforts.

The Annual HGMS Gem, Jewelry, Mineral, and Fossil Show (http://hgms.org/ click on Annual Show) runs from November 7th through the 9th at the Humble Civic Center. Janet Combes could use some help (281-463-1564).

We finally received 25% of the expected proceeds from the 2014 AAPG ACE held in Houston. Past President Barry Katz requested those funds last May per our contract with AAPG. Given that money, what that means for our full share, and the monies received from the 100% HGS-run events at the ACE, we had a very profitable 2014 ACE with AAPG. General Chairman Steve Brachman and his entire committee deserve a big thanks for their efforts.

I have to come back to some key thoughts:

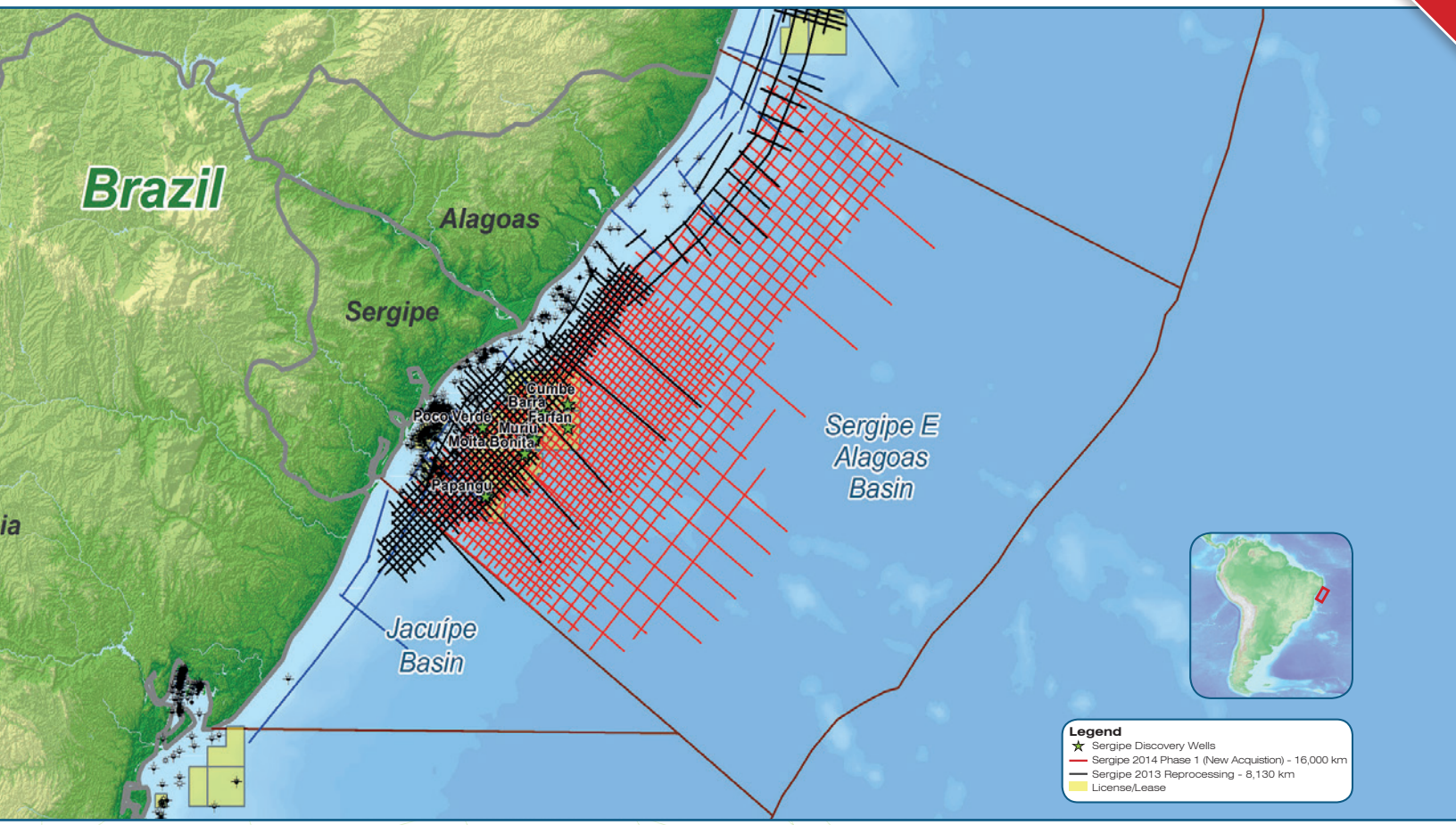
- Being a professional society member is part of your professional development.
- Professional society membership is more than having your name in a directory.
- Networking is not just about compiling a list of contacts.
- You never know which event can profoundly impact your future.

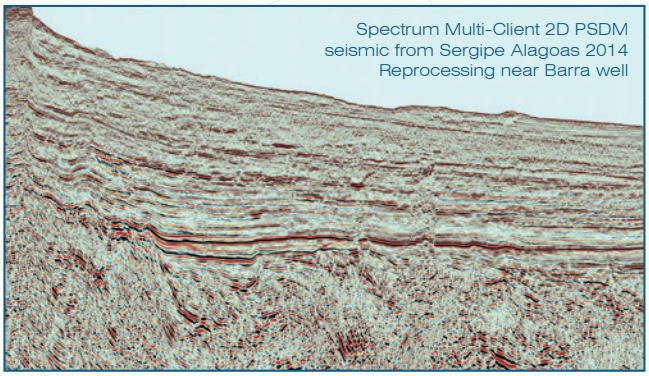
So, I ask, What about you? Will you answer the call? Will you be thankful for the opportunity to serve your professional society when it's your turn to write this column? ■

visit us at SEG, Denver booth #554

Brazil: Sergipe Alagoas

New 2D Multi-Client Seismic Data Available





Spectrum Multi-Client 2D PSDM seismic from Sergipe Alagoas 2014 Reprocessing near Barra well

Spectrum has commenced a 16,000 km Multi-Client 2D seismic survey offshore Brazil in the Sergipe and Alagoas Basins along the Eastern Margin of Brazil. The new acquisition program will tie key wells in the Basins including the recent Barra, Muriu, and Farfan discoveries. PreSTM and PreSDM data will be available in Q4 2014.

To supplement the new acquisition in this active exploration area, Spectrum has completed the reprocessing of 8,130 km of data through both PreSTM and PreSDM and is offering this data to industry in order to gain a head start on the expected upcoming round in 2015.

+1 281 647 0602
mc-us@spectrumasa.com
www.spectrumasa.com

Spectrum

Monday, November 10, 2014

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $45 Preregistered members; $50 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

HGS North American Dinner Meeting

James M. Rine, Brittany Hollon, Robert Fu, and Michael Waddell

Reconstruction of Diagenetic and Burial History of South Georgia Rift Basin: an Example of Rifting, Drifting and Inversion Along the Passive Margin of Eastern North America Based on Analyses of Sandstones from the Rizer #1 Test Borehole, Colleton County, SC

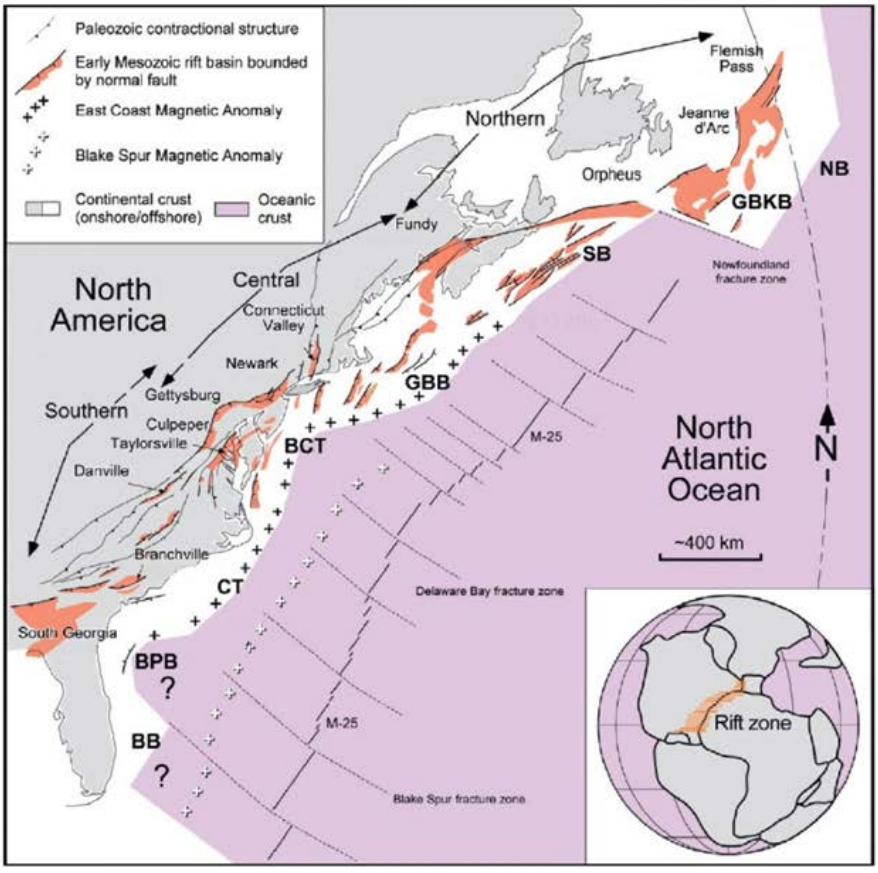


Figure 1. Major Paleozoic contractional structures and early Mesozoic rift basins of eastern North America with key tectonic features of the eastern North Atlantic synthesized by Withjack et al. (2012). South Georgia Rift Basin (SGRB) is southernmost basin identified in system. Mesozoic/Cenozoic post-rift basins are: Bahamas basin (BB); Blake plateau basin BPB; Carolina trough (CT); Baltimore Canyon trough (BCT); Georges Bank basin (GBB); Scotian basin (SB); Grand Banks basin (GBKB); & Newfoundland basin (NB). Inset map of Pangaean supercontinent during Late Triassic based on reconstruction of Olsen (1997) shows approximate extent of rift zone between eastern edge of North American plate and northwestern edge of African plate. Figure modified from Withjack et al., (2012).

Petrologic examination of sandstones from a portion of the Late Triassic South Georgia Rift Basin (SGRB) reveals a complex burial history that is similar to that of other early Mesozoic basins studied along the passive margin of central eastern North America. During the Early Jurassic, SGRB strata were intruded by numerous igneous dikes and sills. This portion of the basin then underwent inversion, which led to the denudation of thousands of feet of SGRB strata that were re-deposited downdip along the continental margin. During the Late Cretaceous, the SGRB was overlain by relatively porous and permeable coastal plain strata.

HGS North American Dinner *continued on page 13*

HGS North American Dinner continued from page 11

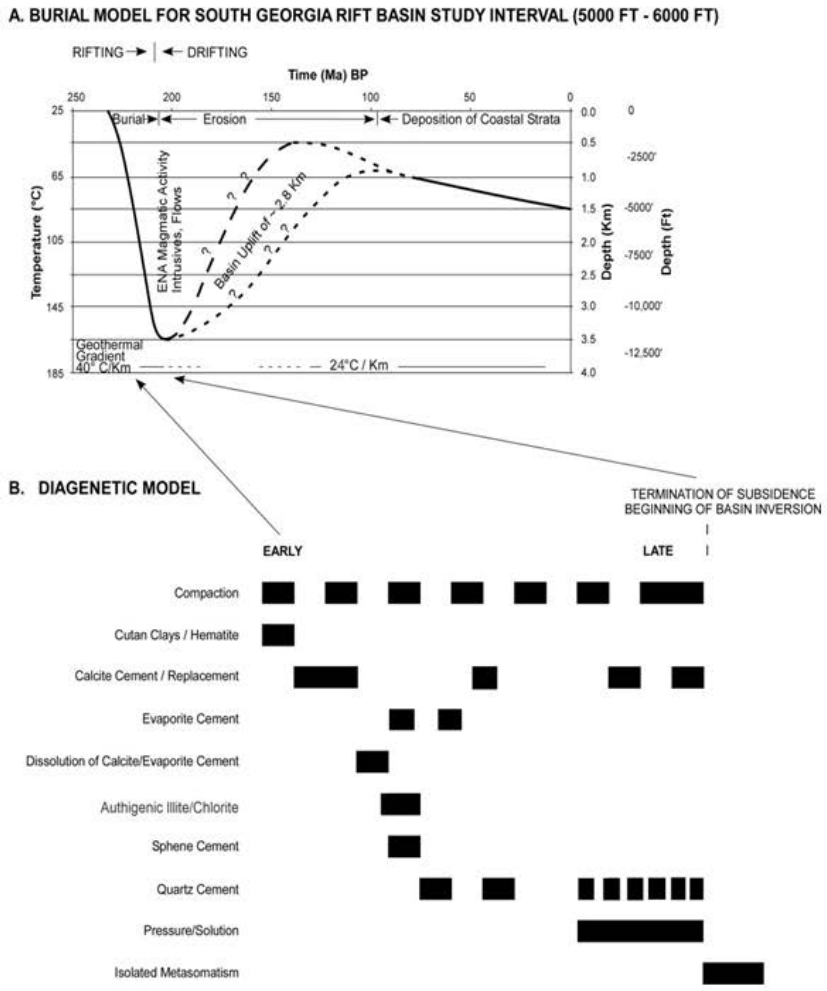


Figure 2. Burial (A) and diagenetic (B) models for South Georgia Rift Basin based on paleo-pore water temperatures inferred from δ^{18} O analyses of quartz cements in sandstones between present burial depths of 5000ft to 6000ft (1.5km to 1.8km). Calculations of paleo-pore water temperatures derived from the SIMS δ^{18} O values are based on the equation of Clayton et al. (1972) and use the VSMOW values of 0 (normal sea water). Timing of the rifting and drifting phases is based on Withjack et al. (2012). Age of end of uplift at 140 Ma BP is based on model of Tseng et al. (1996) for Taylorsville Basin in Virginia. The unconformity at the top of the Late Triassic/Early Jurassic is overlain by South Carolina coastal plain strata beginning with the Turonian/Coniacian-aged (94 Ma BP) Middendorf Formation (Colquhoun et al., 1983). Recent to Cretaceous geothermal gradient is based on Temples and Waddell (1996).

The original objective of the SGRB study, which extends from northern Florida into South Carolina (**Figure 1**), was to evaluate the basin's potential to sequester CO_2, produced by numerous coal-fired power plants within the region. In addition to tens of miles of seismic run to characterize the SGRB, the Rizer #1 test borehole was drilled in Colleton County, South Carolina, and conventional core and selected rotary side wall cores from 2600 to 6200ft were analyzed. The original sequestration objective of this project was abandoned due to the poor reservoir quality of the sampled interval, and the project was revised to determine why the reservoir properties of this portion of the SGRB are so poor and whether or not more porous sections might be present in other parts of the SGRB. What resulted from the petrologic and isotopic (δ18O) analyses was a diagenetic and burial history of the SGRB similar to that of other Triassic basins along the eastern edge of North America.

Although porosity reduction within the Rizer #1 sandstones (lithic arkoses to feldspathic litharenites) is largely due to compaction, a complex diagenetic scenario added to destruction of reservoir quality (**Figure 2**). Early cements consisted largely of calcite spar and occurred in volumes sufficient to inhibit compaction within portions of the sequence. Feldspar grains were also replaced during this early calcite cementation stage, a phenomenon that re-occurred during a later stage of calcite cementation. Sphene cements (1-2% by volume) also formed relatively early. Pore rimming chlorite followed the dissolution of some of the early calcite and evaporite cements.

For one group of SGRB sandstones, secondary intergranular pores were subsequently filled with quartz overgrowths at less than 6600ft (2 km) of burial. This quartz cement formed in volumes sufficient to allow the remaining intergranular porosity to be preserved temporarily. For other sandstone groups, dissolution of early cements resulted in compaction and pressure-solution. At least two additional stages of quartz and a late stage of calcite cementation subsequently occluded the remaining pores for both groups of sandstone. Based on δ18O measurements of quartz cements, utilizing a Secondary Ion Mass Spectrometer (SIMS)

HGS North American Dinner *continued on page 15*

GEOSCIENCE PROFESSIONALS

Join a multidisciplinary team of experienced professionals evaluating conventional and unconventional resources at Saudi Aramco. Take the opportunity to develop frontier source rock and tight reservoir basins among world's largest known and most complex reserves. Employ advanced seismic processing techniques, including 3D visualization and remote geosteering of multilateral wells, to drill and produce prospects in subsalt plays. Utilize cutting-edge technology to identify and manage reserves in a diverse environment. With the capability and technology to apply your vision, Saudi Aramco is the place to take your career to the next level.

At Saudi Aramco, advance your career while experiencing a work-life balance. Enjoy a flexible schedule that offers a chance to explore the wealth of activities in Saudi Arabia. We offer a competitive salary with quality benefits featuring a generous travel allowance, six weeks of vacation, excellent healthcare, and a family-friendly lifestyle with access to top-rated schools. If you've ever wondered about Saudi Aramco and the expatriate lifestyle, now is the time to pursue it.

SAUDI ARAMCO PROVIDES A CHANCE TO DO IT ALL.

DREAM BIG at www.Aramco.Jobs/HGS

continued from page 13

and, on modal petrographic analysis of compaction indices, it was determined that maximum burial depths were at least 6600ft (2km) deeper than they are now. ■

Acknowledgments

DOE/NETL Acknowledgment:

This material is based upon work supported by the Department of Energy under Award Number DE-FE0001965.

References Cited

Clayton, R.N., J.R. O'Niel, and T.K.Mayeda, 1972, Oxygen isotope exchange between quartz and water: *Journal of Geophysical Research*, v. 77, p. 3057-3067.

Colquhoun, D. J., L.D. Woollen, D.S.Van Nienwenhuise, G.G.Padgett, R.W.Oldham, D.C. Boylan, J.W. Bishop, and P.D. Howell, 1983, Surface and subsurface stratigraphy, structure and aquifers of the South Carolina Coastal Plain: Columbia, SC, State of South Carolina, Office of the Governor, 78

Olsen, P.E., 1997, Stratigraphic record of the early Mesozoic breakup of Pangea in the Laurasia-Gondwana rift system: *Annual Reviews of Earth and Planetary Science*, v 25, p 337-401.

Rine, J.M., B. Hollon, R. Fu, N. Houghton, and M. Waddell, 2014. Diagenetic and Burial History of a Portion of the Late Triassic South Georgia Rift Basin Based on Petrologic and Isotopic (δ18O) Analyses of Sandstones from Test Borehole Rizer #1, Colleton County, SC: American Association of Petroleum Geologists 2005 Annual Convention, Houston, TX, April 2014.

Temples, T.J. and M.G. Waddell, 1996, Application of petroleum geophysical well logging and sampling techniques for evaluating aquifer characteristics: *Gound Water*, V. 34, p. 523-531.

Tseng, Hsin-Yi, T.C. Onstott, R.C. Burruss, and D.S. Miller, 1996, Constraints on the thermal history of Taylorsville Basin, Virginia, U.S.A., from fluid-inclusion and fission-track analyses: implications for subsurface geomicrobiology experiments: *Chemical Geology*, v. 127, p. 297-311.

Withjack, M.O., R.W.Schlische, and P.E. Olsen, 1998, Diachronous rifting, drifting, and inversion on the passive margin of central eastern North America: An analog for other passive margins: *AAPG Bulletin*, v. 82, p. 817-835.

Biographical Sketch

James Rine has over 30 years of professional and academic experience in the field of geology. Jim received his PhD in marine geology and geophysics from the Rosenstiel School of Marine and Atmospheric Sciences at the University of Miami (FL), where he studied modern shallow marine mud environments. Since then Rine has published on a variety of topics ranging from studies of modern continental shelf sands and muds, to depositional history of a giant oil field in the Gulf of Suez, groundwater hydrogeology of portions of the South Carolina Coastal Plain, and characteristics of porosities in siliciclastic mudrocks. Dr. Rine is a principal geologist/geologic advisor with Weatherford Laboratories in Houston, TX.

ROCK SOLID Quantitative INTERPRETATION

A successful quantitative interpretation project requires high-quality seismic and well data combined within a flexible, sophisticated framework of attribute technology underpinned by world-class rock physics expertise: it's not a button push.

At RSI, we combine all these elements within flexible workflows implemented by experienced integrated teams of petrophysicists, geophysicists and geologists. Let RSI maximize your return on your QI investment.

Gather Conditioning	Well-Log Conditioning Well Tie	Background Models	Attributes & Inversion	Rock Physics & Calibration	Multiphysics Integration	SAAM™ Derisking

SAAM is a trademark of Rose & Associates, LLP

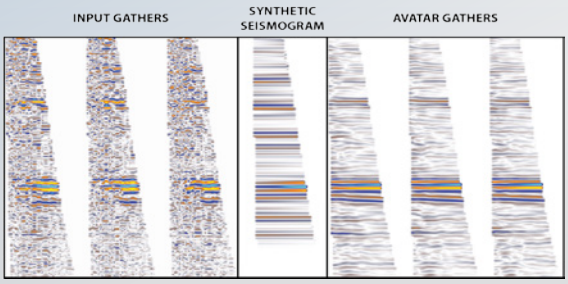
AVATAR®

Seismic Data Conditioning

Challenge

Most seismic data are processed to optimize image quality for structural interpretation, with little regard to preserving characteristics for successful pre-stack and post-stack interpretation, whether qualitative or quantitative. The result:

- Poorly imaged faults
- Unreliable horizon picking
- Erroneous AVO and impedance attributes
- Poor well ties

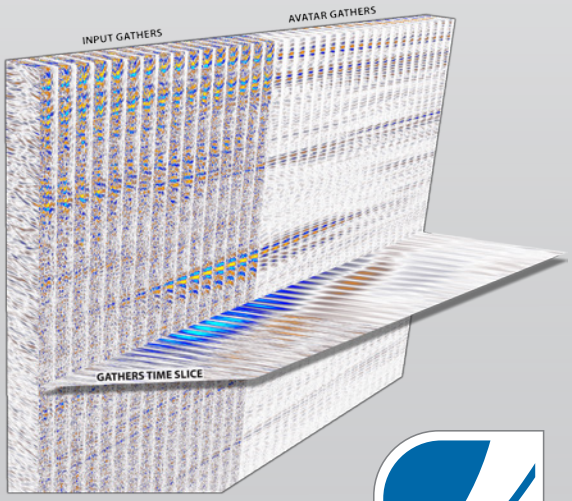


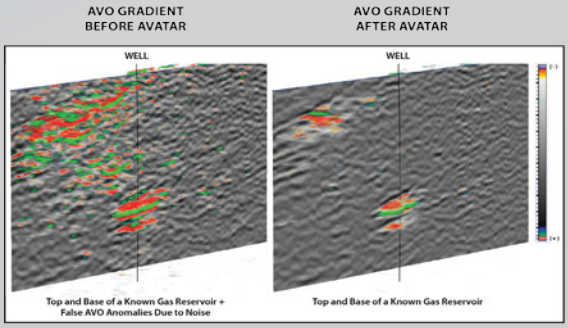
Solution

AVATAR: a sophisticated toolkit of pre and post stack data conditioning steps designed to improve the robustness and reliability of automatic interpretation algorithms, seismic attribute analysis, AVO, pre-stack or post-stack inversion and seismic facies classification.

AVATAR advantages

- Cost-effective alternative to new data acquisition or full reprocessing
- Can be applied pre-stack and post-stack
- Better, faster interpretation
- Improved horizon auto-tracking
- Robust AVO and impedance results
- Superior stratigraphic models
- Optimum well tie
- Improved property prediction





For more details contact us at: sales@rocksolidimages.com

Extraordinary Results. By Any Measure.

RSI

RockSolidImages.com/Avatar

Wednesday, November 12, 2014

Black Lab Pub, Churchill Room • 4100 Montrose Blvd.

Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $30 Preregistered members; $35 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

H.C. Clark
Professor Emeritus,
Rice University

Springfield Spring and Groesbeck's Water Supply – a Cautionary Tale for Small Towns in Texas

Figure 1a. *Springfield Spring*

Figure 1b. *Fort Parker State Park Lake*

Figure 2. *Lake Springfield Dam*

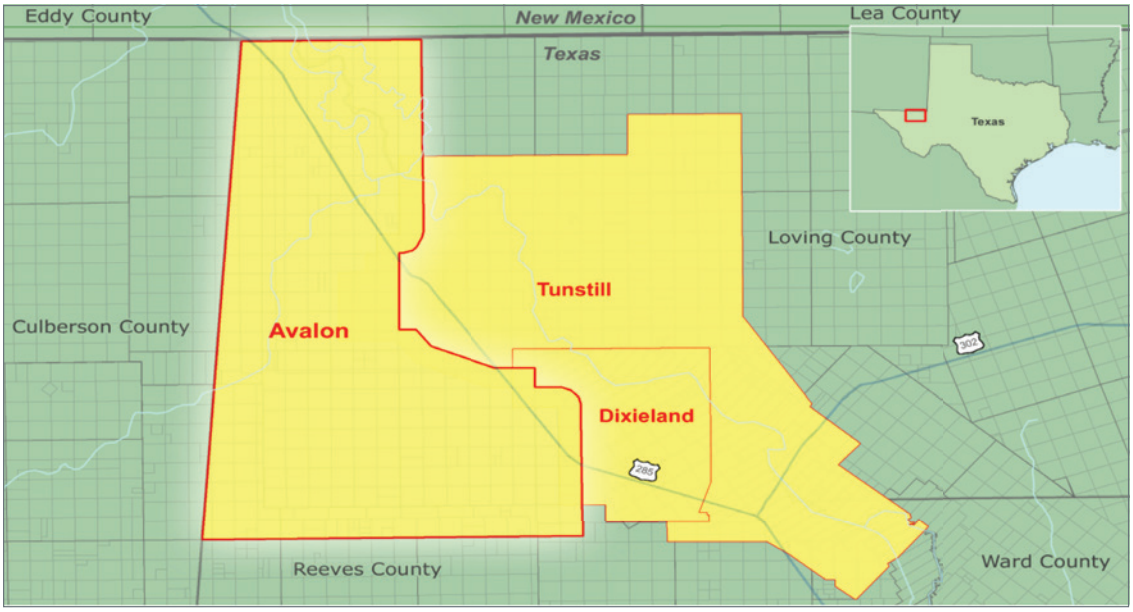
Many small towns (and some very large cities) in Texas owe both their origin and continued viability to hydrogeology; Groesbeck (between Waco and I-45) is one of the small ones, and its water situation serves as a template for both geological and geopolitical concerns. Here, the Springfield Spring (**Figures 1a, b**), above a dammed reach of the Navasota River in Fort Parker State Park (**Figure 2**), has historically (and really perpetually) provided a flow sufficient to meet Groesbeck's summer water needs. Over the winter months, the Navasota typically tops the dam at the park and provides far more water than needed, but it's the summer that's the problem. The Texas drought of 2011 made us all question our water supplies; and this small town began to address several options, not all of them hydrologically reasonable. Alternative emergency water supplies considered included two test wells, an abandoned rock pit, the town's historic brick pit, its treated waste water, Lake Limestone water rights and several more.

It was uncertainty about the reliability of the Springfield Spring that led to a series of measurements of its flow, beginning at the height of the drought in late 2011 and continuing to the present. Over time, from then until the present, flow at the spring has ranged from several hundred gallons per minute during the summers to well over a thousand in the winter months. Remarkably, the spring flow that ebbs, but does not end, in

HGS Environmental and Engineering Dinner *continued on page 19*

Avalon 3D Seismic Survey

A new state-of-the-art multi-client solution in the prolific Delaware Basin



Located in one of North America's most prolific basins, the newly acquired 282 square mile high-end 3D seismic survey offers four hundred fold broadband data. Setting a new standard, Avalon will allow better imaging to address the noise and statics challenges in the area.

Targeting the Bone Springs, Wolfcamp and Cline formations, the complete solution ties the geophysical data to the geology enabling enhanced sweet spot detection and improved hazard avoidance for optimal well placement. The project uses a multi-disciplinary approach comprising advanced imaging, reservoir characterization and microseismic monitoring.

Enhance your return on investment today with this unique solution.

Contact: Rick Trevino
+1 832 351 1051
rick.trevino@cgg.com

Cheryl Oxsheer
+1 832 351 8463
cheryl.oxsheer@cgg.com

cgg.com/multi-client

CGG
Passion for Geoscience

HGS Envrionmental & Engineering Dinner continued from page 17

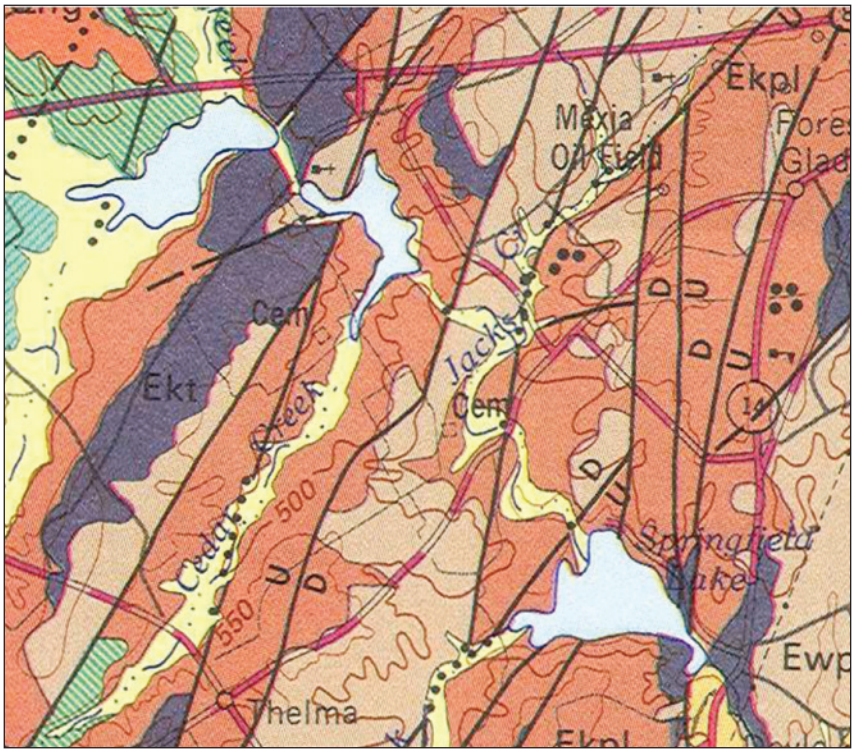


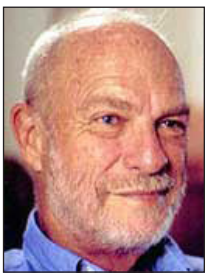
Figure 3. *Mexia-Tehuacana Fault Zone, modified: Geologic Atlas of Texas, Waco Sheet*

the summer recovers quickly with the onset of fall and winter rains. Apparently, this is because reservoir recharge takes place almost immediately along one or more normal faults north and up-gradient from the spring. The spring itself exits at another fault that is the eastern boundary of the reservoir. The fault complex is part of the Mexia-Tehuacana fault zone (**Figure 3**), trending approximately north-south here, perpendicular to the river. The reservoir involves the carbonate-cemented sandstone of the Kincaid-Tehuacana member and interlayered and poorly cemented sands of the underlying Pisgah member. Excavated Tehuacana rocks dramatically illustrate extensive dissolution as groundwater worked its way through the fault complex, and fault related cavities may play a role.

While the spring is geologically fascinating, it serves to illustrate a much larger problem, both now and in the near future: to be sustainable, a small town must be assured of a base water supply, and that assurance often involves a hydrogeologic framework, and above all that supply must be sustainable. Groesbeck is fortunate – it has the spring; but its quest for additional water mirrors the situation facing many other small towns. For example, while it is reasonable for us (us geologists) to look to the Trinity sands to the west and the Wilcox Simsboro on the east side of Limestone County, both appear beyond the infrastructure limit for this small town. Surface water alternatives are nearby and attractive, but they fall victim to the same issues that create a critical need in the first place, surface source and evaporation. A water system shared by several towns would be impractical.

In the end, each small town in Texas must find a combination of water sources, minimize the geopolitics of water and recognize that to be sustainable, future growth may be limited - it's the sustainable part where geologists come in. ■

Biographical Sketch



H.C. Clark retired from the Rice University Geology Department in the Late Pleistocene. Though he still practices geology, mainly environmental, much of his time is spent tending his cows and their calves at his farm at Big Hill, on the edge of the Brazos Valley, west of Groesbeck, whose nearby spring is the subject of this talk. He may be reached at hcclark@rice.edu.

Monday, November 17, 2014

HGS Joint General and International Dinner Meeting

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $45 Preregistered members; $50 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

Tony Doré
Statoil U.K. Ltd

The Robert E. Sheriff Lecture Series

Sponsored by the Department of Earth and Atmospheric Sciences at University of Houston and the U.H. Geoscience Alumni Association

In addition to the presentation by the guest speaker, Dr. Hua-wei Zhou, Chair of the Department of Earth and Atmospheric Sciences, will present an update of activities at U.H. as well as the departmental Outstanding Alumni Award. There will be a poster session on current thesis and dissertation research of U.H. students.

Come and meet the next generation of geoscientists from the University of Houston!

The Robert E. Sheriff Lecture Series was initiated in 1999 by the University of Houston Geoscience Alumni Association to honor Dr. Sheriff as an educator, scholar, and proponent for the geosciences. The series has recently been co-sponsored by the Houston Geological Society.

The Sheriff Lecture mission is to
bring some of the best known geologists and geophysicists in the world to the Houston community to share ideas relevant to exploration geology and geophysics, and to showcase geoscience activity at the University of Houston.

A full list of the Student Posters will be available on the HGS Website.

Thanks to BP for their Financial Support of Student Participation.

R.E. Sheriff Lecture: The Arctic – a Tectonic Tour through the Last Great Petroleum Frontier

The general consensus is that the Arctic contains a significant proportion of the world's undiscovered conventional hydrocarbon resources, with gas probably predominating over oil. Thus, the region can contribute a major part of the world's energy mix in the next century. This thinking has provoked a marked surge in exploration activity in recent years, with significant offshore acquisition and some landmark discoveries. However, the right geological setting and yet-to-find resources only mark the beginning of the Arctic challenge. In this remote frontier, social, environmental, logistical and cost issues are equally important. But – for today – we will concentrate on the geology.

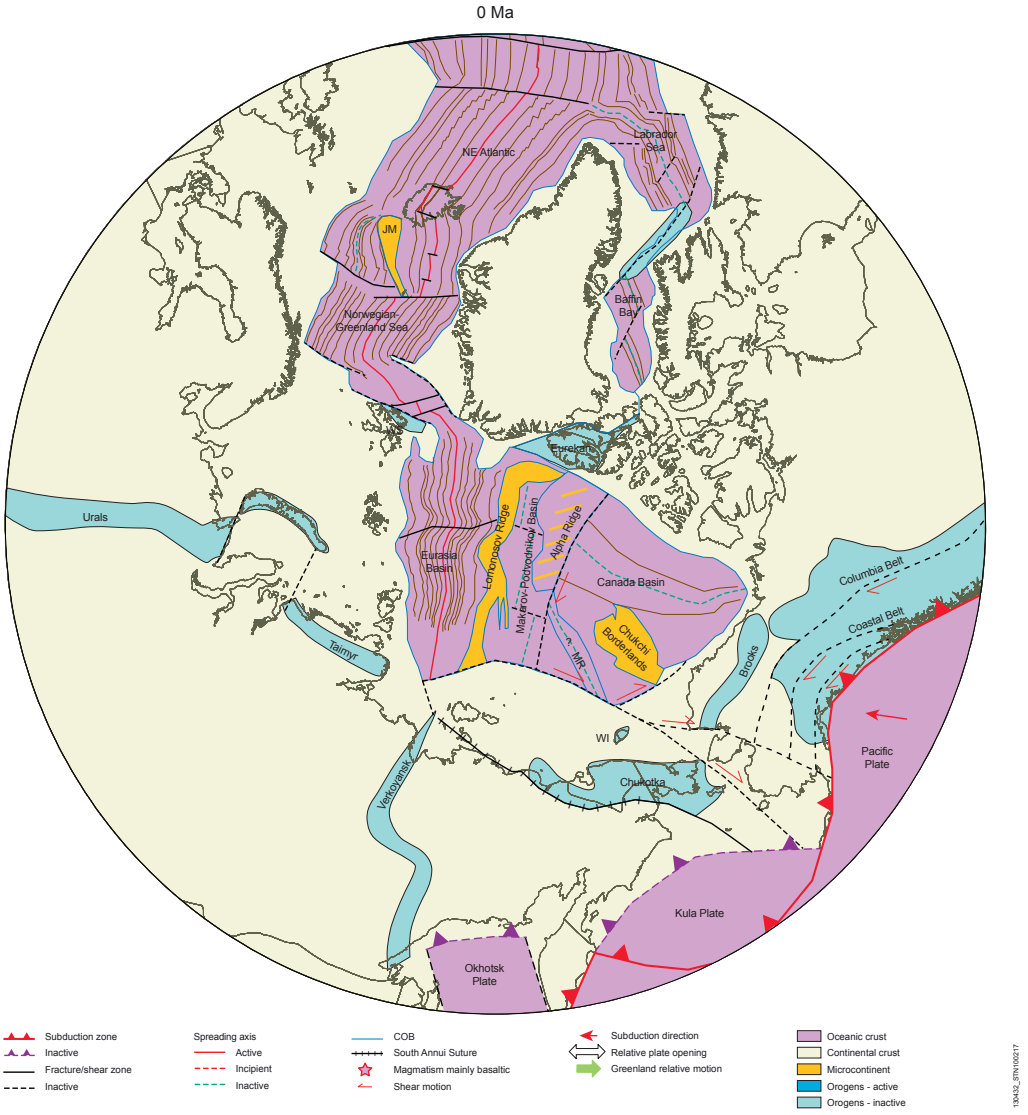
The Arctic Ocean occupies the unique setting of being a small ocean between two much larger oceans – the subducting Pacific margin and the opening North Atlantic. Unlike other oceans of the world, evidence on both timing and geometry is poor,

HGS Joint General and International Dinner *continued on page 23*

HGS Joint General and International Dinner

continued from page 21

and major elements of the plate tectonic evolution are still "up for grabs". A 3-stage kinematic model will be shown that seems to best satisfy the known constraints. As we take an animated tour through the Arctic's plate tectonic evolution, we will meet some of the major Arctic controversies. We will also see how radical changes in plate motion within this confined space led to juxtaposition in time and space of several significant shear margins.



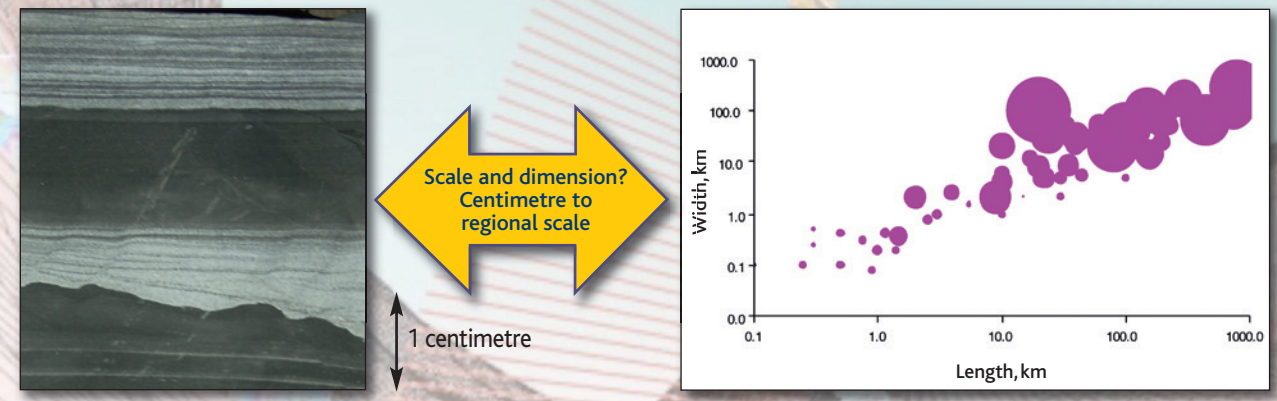
Because the Arctic has experienced significant plate motion from the Cretaceous to the present, and because of the ambiguities in the oceanic signature; resolving the most likely kinematic history is critical for understanding paleogeography, and hence reservoir and source distribution. Shear margins have distinct characteristics in terms of basin configuration, local structure and thermal evolution, the knowledge of which will be relevant as petroleum exploration progresses in the Arctic.

Biographical Sketch

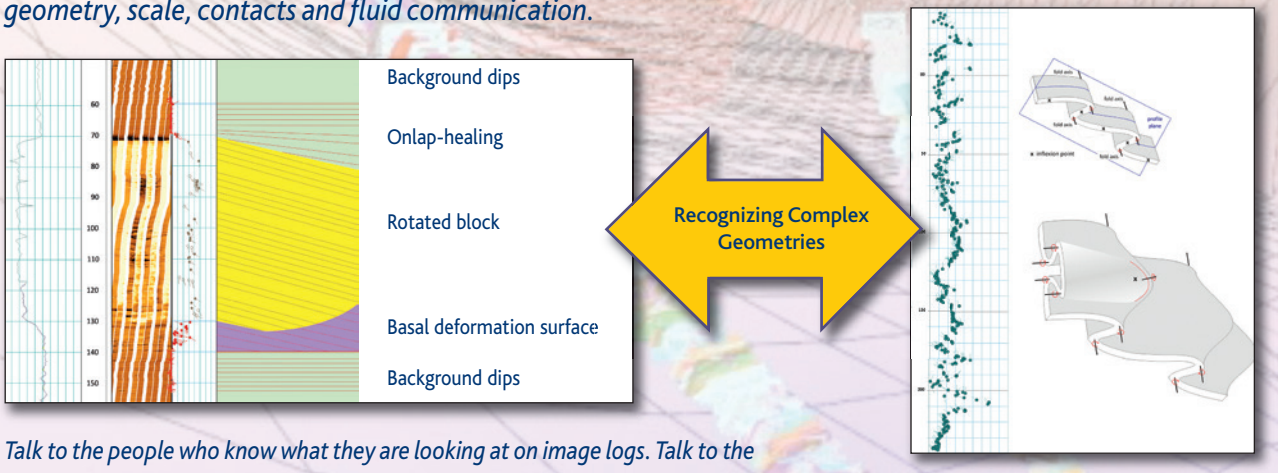
Tony Doré obtained his PhD from University College, London and joined the petroleum industry in 1977. He has held senior technical and leadership positions with Statoil for 19 years, including VP of Statoil North America 2008-2011, and is currently based in London. He has worked petroleum provinces all over the world, with emphasis on NW Europe, the Arctic and the Americas. Tony has published on stratigraphy, NE Atlantic - Arctic evolution, basement reactivation, basin modeling, passive margin structure, hyperextension, exhumed petroleum systems and exploration risk analysis. He has edited books on basin modeling, resource quantification and passive margins. He was Editor-in-Chief of the journal, *Petroleum Geoscience*, between 2006 and 2009. Tony was chairman of the Geological Society Petroleum Group from 2001-2003, chaired the 2003 Petroleum Geology of NW Europe conference and edited the subsequent proceedings (2005). He is on the advisory boards of several universities and currently holds an Honorary Professorship at Durham University. His awards include the Petroleum Group Medal (2006), Order of the British Empire (OBE) in 2010 for services to geology, and the AAPG Special Award, 2011.

Getting into **Deep Water**

RECOGNISING MASS TRANSPORT COMPLEXES (MTC) are part and parcel of any exploration or development in continental margin, abrupt margin and submarine canyon plays. Based on hundreds of kilometres of image and cores studies, **TASK FRONTERRA** has determined that at least 12% of deep marine deposits are deformed by creep, failure or rotational slumping. We have conducted numerous studies in the Gulf of Mexico, West Africa, Brazil, West of Shetlands, Nile Delta, Australia: North West Shelf and Malaysia.



Whether you are looking to sequester CO_2 in compartmentalized sediments, or looking at field development strategies – you want to be using the people who can measure and characterize these sediments in terms of geometry, scale, contacts and fluid communication.



Talk to the people who know what they are looking at on image logs. Talk to the people who have worked on MTC compartmentalization in fields across the globe.

A GLOBAL FOOTPRINT – OFFICES IN TEN LOCATIONS ACROSS EUROPE, NORTH AND SOUTH AMERICA, THE MIDDLE EAST AND ASIA PACIFIC. COMPLIMENTARY EXPERTISE TO ASSIST CLIENTS IN THEIR UNDERSTANDING OF MATURE RESERVOIRS, CARBONATES, DEEP-WATER FIELDS AND UNCONVENTIONAL HYDROCARBONS, ESPECIALLY SHALE GAS WITH OUR INTEGRATED SHALE GAS WORKFLOW.

TASK Fronterra GEOSCIENCE

ABERDEEN • BOGOTA • CAIRO • DENVER • HOUSTON • MIDLAND • OKLAHOMA CITY • PERTH • TULSA • VIENNA

TASK FRONTERRA GEOSCIENCE 2401 PORTSMOUTH, SUITE 280 HOUSTON, TX 77098 TEL: +1 713 634 0777

www.taskfronterra.com

Tuesday, November 18, 2014

Hyatt North Houston (former Crowne Plaza Hotel – Greenspoint)

Social 11:15 AM, Luncheon 11:30 AM

Cost: $45 Preregistered members; $50 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

HGS Northsiders Luncheon Meeting

Dr. Aislyn Trendell Barclay
Anadarko Petroleum Corporation
The Woodlands, Texas
Aislyn.Trendell@Anadarko.com
Dr. Stacy Atchley and Dr. Lee Nordt
Baylor University, Waco, Texas

Subsurface Prediction of Fluvial Systems: Are Current Models Adequate? A Case Study of the Late Triassic Chinle Formation in Petrified Forest National Park

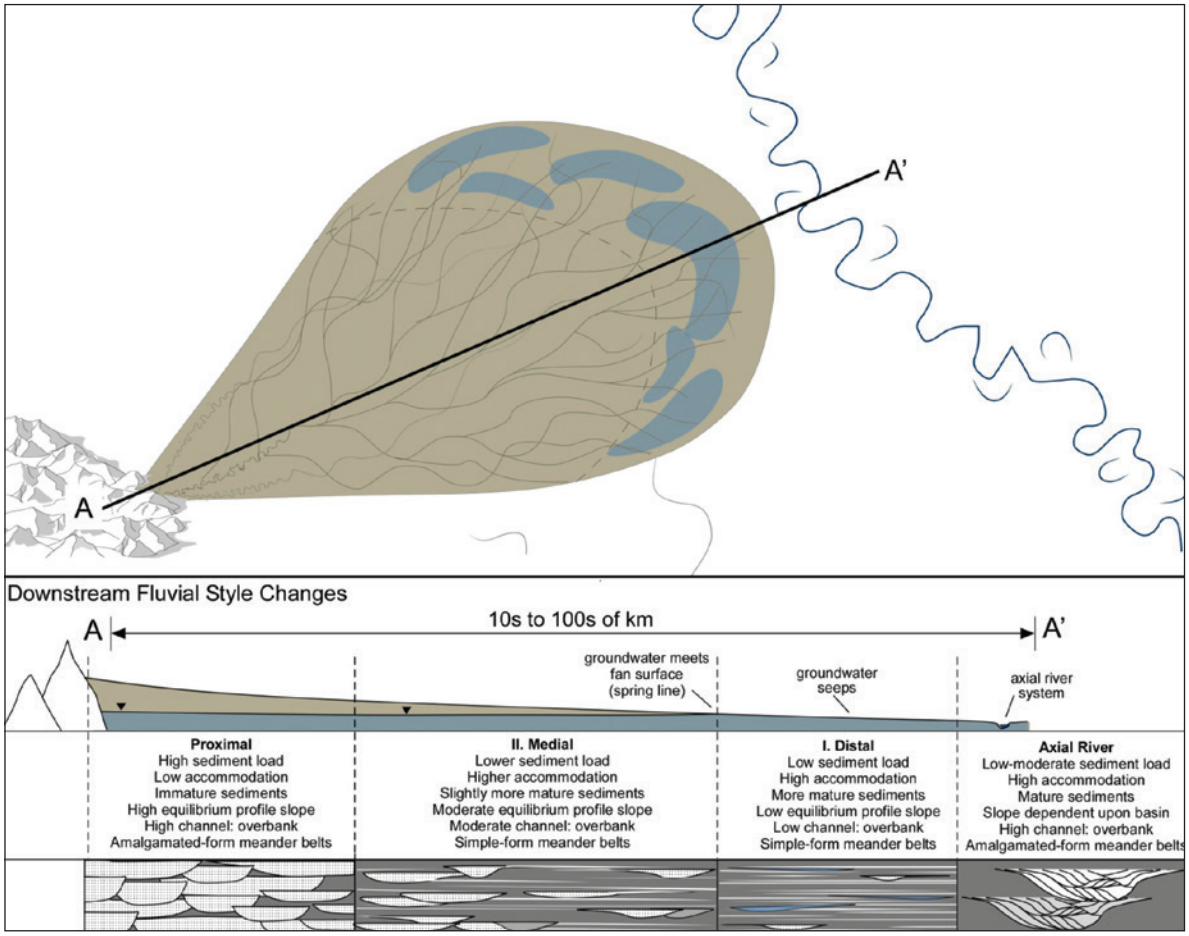


Figure 1. *Conceptual illustrations of a Fluvial Distributary System showing the plan view of the system within a basin and a conceptual cross-section of the fluvial fan.*

Petroleum geologists often rely on depositional models, based on modern system analogues, to predict the distribution of reservoirs in the subsurface. Existing fluvial models are problematic for application in the subsurface because they are channel-focused, rather than basin-focused, and are based predominantly on modern fluvial systems in degradational regimes. Recent work suggests that foreland basins contain distributive fluvial systems, rather than tributary fluvial systems, and undergo relatively systematic changes in fluvial style with distance from the fluvial apex (**Figure 1**). Refinement of the distributive fluvial model has resulted in increased recognition of these systems in the sedimentary record. **HGS Northsiders Luncheon** *continued on page 27*

12TH ANNUAL

World-Class Education Conference

HOUSTON, TEXAS
MARCH 2-6, 2015

Courses Include:

- Deepwater Reservoir Connectivity
- Exploration for Deep-water Sands Using Seismic Sequence Methodology
- Carbonate Reservoir Geology: Understanding Depositional and Diagenetic Factors Controlling Porosity
- Carbonate Depositional Systems
- Microbial Carbonate Reservoir Characterization
- Basic Seismic Interpretation
- Seismic Amplitude Interpretation
- 3D Seismic Attributes for Unconventional Resources
- Discovery and Recovery Thinking in Shales
- Introductory Geochemistry for Condensate-rich Shales and Tight Oil
- Log Analysis of Shaly Sand Reservoirs
- Log Analysis of Hydrocarbon-Bearing "Shale" Reservoirs

Hosted by:

Norris Conference Center
816 Town & Country Lane, Suite 210
Houston, TX 77024

Phone: 713-590-0950
Fax: 713-590-0961

(Special AAPG Group Rates at Nearby Hotels)

Registration and Information
Call AAPG toll free in the U.S. and Canada at 888.338.3387 or 918.560.2650
F: 918.560.2678 • E: educate@aapg.org •
W:www.aapg.org/career/training/in-person/education-conference

AAPG | World-Class Education Conference 2015
March 2-6, 2015 - Houston, Texas

Upcoming Education Courses

SHORT COURSES

Last Chance! Fall Education Conference	**Nov. 10-13, 2014** Houston, TX
Practical Salt Tectonics	**Dec. 8-11, 2014** Houston, TX
Unconventionals Update (with IPTC meeting)	**Dec. 8-9, 2014** Kuala Lumpur, Malaysia

E-SYMPOSIA

Multiscale Modeling of Gas Transport and Storage in Shale Resources	**Dec. 2, 2014** 2:00 pm, CDT

ONLINE CERTIFICATE COURSES

Biomass Energy Basics: A Renewable Energy Certificate Course
(self-paced – course begins on the first day of each month)

Geothermal Energy Basics: A Renewable Energy Certificate Course
(self-paced – course begins on the first day of each month)

Renewable & Non-Renewable Resources – Overview & Integration
(self-paced – course begins on the first day of each month)

Solar Energy Basics: A Renewable Energy Certificate Course
(self-paced – course begins on the first day of each month)

Wind Energy Basics: A Renewable Energy Certificate Course
(self-paced – course begins on the first day of each month)

5-course set – Online Renewable Energy Certificate Courses
Save when you sign up for all five of the above courses at the same time!

Giant Oil & Gas Fields
(self-paced – course begins on the first day of each month)

Introduction to Shale Gas
(self-paced – course begins on the first day of each month)

Unconventional Resources
(self-paced – course begins on the first day of each month)

www.aapg.org/career/training/

AAPG Education

HGS Northsiders Luncheon continued from page 25

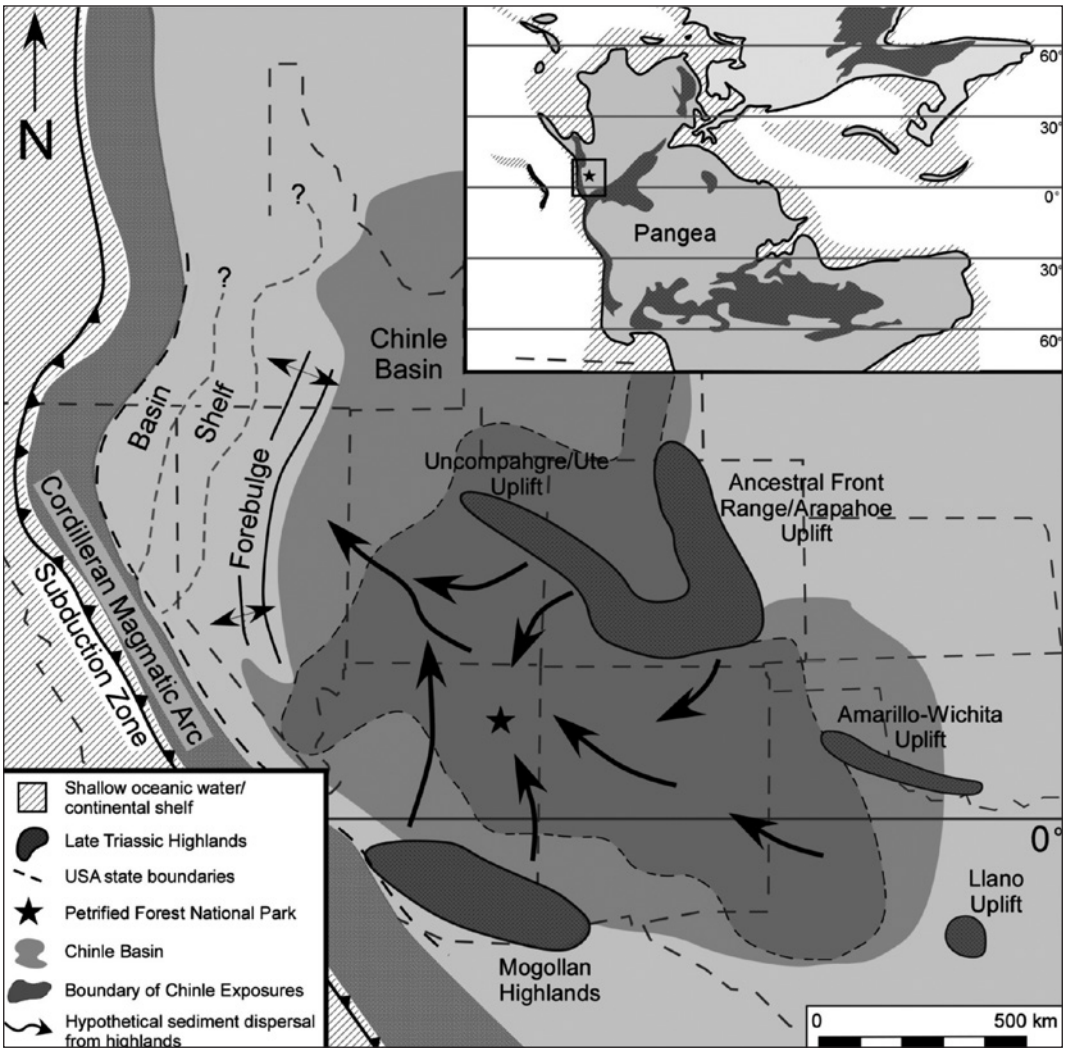


Figure 2. *Late Triassic Paleogeography*

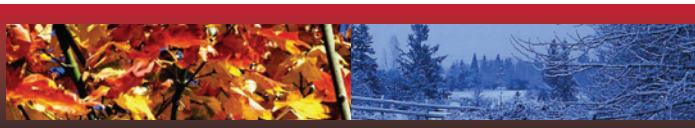
The Chinle Formation was deposited within a large back-arc basin across the southwestern United States during the Late Triassic (**Figure 2**). It consists of paleosol-bearing alluvial strata whose characteristics vary markedly through the stratigraphic record. The study succession records a progressive up-section increase in grain size, increase in channel depth and width, and increase in lateral and vertical connectivity of channel deposits. Upsection changes in fluvial style result in greater porosities and represent more continuous and connected reservoir sand bodies.

In this HGS presentation, tributary and distributary fluvial models will be compared and contrasted. The characteristics of the Chinle Formation at Petrified Forest National Park will be discussed to determine the best-fit model. This talk will combine paleoclimatic data, fluvial architectural attributes, and petrology in order to understand better the depositional processes and forcing mechanisms that may account for evolving fluvial deposition throughout the study interval. ■

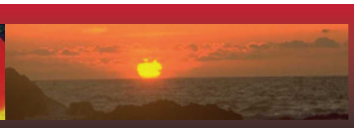
Biographical Sketch

Aislyn Trendell Barclay is currently working as a geologist at Anadarko Petroleum Corporation in Houston. She received her PhD in geology from Baylor University in Waco, Texas, where her studies were focused on sedimentology and stratigraphy. She received a BS (Geology) degree from McMaster University in Ontario, Canada. Her PhD dissertation focused on allocyclic and autocyclic mechanisms controlling fluvial style variations and resultant changes in reservoir characteristics. At Anadarko, she currently works the Wolfcamp Shale Formation in the Delaware Basin. She also worked as a summer intern for Pioneer Natural Resources and Talisman Energy Inc. She is a recipient of scholarships from AAPG, GSA, RMAG, FWGS and various other societies. Her interests currently include shale depositional systems, stratigraphy and reservoir characterization.

November 2014



Sunday	Monday	Tuesday	Wednesday
	Reservations: The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476. **Reservations for HGS meetings must be made or cancelled by the date shown on the HGS Website calendar, normally that is 24 hours before hand or on the last business day before the event.** If you make your reservation on the Website or by email, an email confirmation will be sent to you. If you do not receive a confirmation, check with the Webmaster@hgs.org. Once the meals are ordered and name tags and lists are prepared, no more reservations can be added even if they are sent. **No-shows will be billed.**		
2	3	4 **HGS Board Meeting** *6 p.m.*	5
9	10 **HGS North American Dinner Meeting** *"Reconstruction of Diagenetic and Burial History of South Georgia Rift Basin: …" James M. Rine, Brittany Hollon, Robert Fu, and Michael Waddell, Page 11*	11	12 **HGS Environmental & Engineering Dinner Meeting** *"Springfield Spring and Groesbeck's Water Supply—a Cautionary Tale for Small Towns in Texas," H.C. Clark Page 17*
16	17 **R.E. Sheriff Lecture HGS Joint General and International Dinner Meeting** *"The Arctic – a Tectonic Tour Through the Last Great Petroleum Frontier ," Tony Doré Page 21*	18 **HGS Northsiders Luncheon Meeting** *"Subsurface Prediction of Fluvial Systems: Are Current Models Adequate? A Case Study of the Late Triassic Chinle Formation in Petrified Forest National Park," Dr. Aislyn Trendell Barclay Page 25*	19
23 30	24	25	26



GeoEvents

Thursday Friday Saturday

Members Pre-registered Prices:		
Dinner Meetings members	$45	
Emeritus/Honorary members	$40	
Student members	$10	
Nonmembers & walk-ups	$50	
Except - Env. & Eng.	$30	
Nonmembers & walk-ups	$35	
Emeritus/Honorary members	$15	

Don't wait, make your reservations online at ww.hgs.org

		1
6	7 **61st Annual HGMS Gem, Jewelry, Mineral, and Fossil Show** *Humble Civic Center*	8
13	14	15
20	21	22
27 *Thanksgiving* HGS office closed	28 HGS office closed	29

November 10-13 2014
AAPG Fall Education Conference
Houston TX

January 19, 2015
HGS Legend's Night
Houston, TX

February 16-17, 2015
Applied Geoscience Conference – Integrated Approaches of Unconventional Reservoirs Assessment and Optimization
Houston, TX

May 18-19, 2015
Applied Geoscience Conference – Interdisciplinary Micro to Macro-Scale Geomechanics
Houston, TX

May 31-June 3, 2015
2015 AAPG
Denver, CO

September 20-22, 2015
GCAGS Annual Convention
Houston, TX

HOUSTON GEOLOGICAL SOCIETY presents

Legends Night 2015

AAPG Imperial Barrel Award

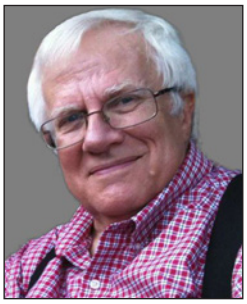
Honoring the Legends That Mold the Geoscientists of Tomorrow

SAVE THE DATE
Monday, January 19, 2015
5:30pm – 9:00pm
Cash bar starts at 5:30pm

Hilton Westchase
9999 Westheimer Rd
Houston, TX 77024

HGS invites you to join us for the next of these memorable dinner events honoring two university professors and Geology Department faculty advisors who have dedicated their time and energy to produce winning teams of the AAPG Imperial Barrel Award.

Brian Lock *University of Louisiana at Lafayette*



Brian Lock has served on the faculty of the School of Geosciences at the University of Louisiana at Lafayette (UL LFT) since 1977. He has been UL LFT's Imperial Barrel Award (IBA) Team Advisor since its inception in 2008. Over the following years, the UL LFT team has won the Gulf Coast Section competition in 2008, 2010, 2012 and 2014, and the global IBA competition in 2012 and 2014. Before joining UL LFT, Dr. Lock was a faculty member at Rhodes University in South Africa, and worked as a field geologist with a consulting group for Norsk Fina in Svalbard. He received his Ph.D. at Cambridge University in 1969.

Chris Zahm *University of Texas*

Chris Zahm is a Research Scientist at the Bureau of Economic Geology (BEG) and Adjunct Professor in the Department of Geological Sciences at the Jackson School of Geosciences at the University of Texas at Austin. Chris has taught Petroleum Basin Evaluation for six years and has been the UT's Imperial Barrel Award (IBA) Team Advisor since 2009. Prior to joining the BEG in 2007, Chris worked 5 years at ConocoPhillips in Houston. Dr. Zahm received his BS in Geology from the University of Wisconsin-Madison in 1993, MS from The University of Texas at Austin in 1998 and PhD from the Colorado School of Mines in 2002.

This HGS special event has limited seating. Please make your reservations online at www.hgs.org. Tickets are $50 per person.

Be a Corporate Sponsor!

Please contact the HGS office, 713-463-9476
or email jill@hgs.org for information on sponsorship opportunities.

All event profits benefit the HGS Scholarship and Calvert Memorial Funds.

HOUSTON GEOLOGICAL SOCIETY presents

Legends Night 2015

AAPG Imperial Barrel Award

Honoring the Legends That Mold the Geoscientists of Tomorrow

SPONSORSHIP FORM

All event profits benefit the HGS Scholarship Funds.

Corporate Platinum Sponsor - $10,000
- Dedicated table with company logo
- 10 complimentary dinner registrations
- Icebreaker reception with scholarship recipients
- Formal recognition at event
- Company name & logo listed as sponsor on online registration page and in related HGS articles

Corporate Gold Sponsor - $5,000
- 8 complimentary dinner registrations
- Icebreaker reception with scholarship recipients
- Formal recognition at event
- Company name & logo listed as sponsor on online registration page and in related HGS articles

Corporate Silver Sponsor - $2,500
- 6 complimentary dinner registrations
- Icebreaker reception with scholarship recipients
- Formal recognition at event
- Company name & logo listed as sponsor on online registration page and in related HGS articles

Corporate Bronze Sponsor - $1,000
- 4 complimentary dinner registrations
- Icebreaker reception with scholarship recipients
- Formal recognition at event
- Company name & logo listed as sponsor on online registration page and in related HGS articles

Individual Sponsor - $500
- 1 Complimentary dinner registration
- Icebreaker reception with scholarship recipients
- Formal recognition at event

Company Name: _____

Sponsorship Type: _____ Amount Enclosed: _____

Contact Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Fax: _____

Email: _____

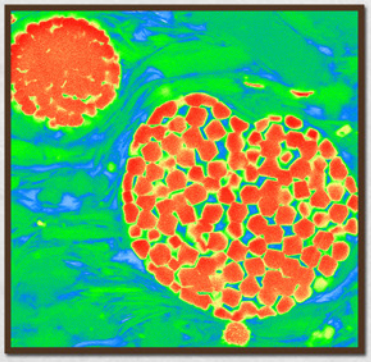
Please submit company logo along with form and payment. Payment by credit card or check. Please make checks payable to *Houston Geological Society*. Email form to sandra@hgs.org or fax to 281-679-5504.

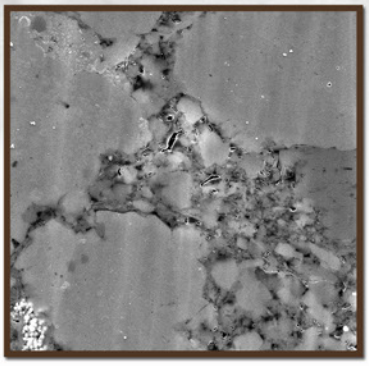
Name of Cardholder:_____ Card Type: _____

Number: _____ Expiration Date: _____

Applied Geoscience Conference

FEBRUARY 16-17, 2015





Integrated Approaches of Unconventional Reservoir Assessment and Optimization

Please join us for the Houston Geological Society's premier technical conference, offering the latest breakthroughs, technical perspectives and integrated approaches to unconventional reservoir assessment.

Our 2015 program includes:

- Eight-session oral technical program, featuring talks by invited experts
- Student posters highlighting industry supported research
- Core display supporting oral technical program

Day 1:

- Integrated Reservoir Characterization Focusing on Macro to Micro to Nano-scale Components
- Natural Fracture Systems & Producibility
- Reservoir Characterization of Lacustrine Mudrock Systems
- Hybrid Unconventional Systems - Tight Targets

Day 2:

- Geologically-driven Completion Techniques in Unconventional Reservoirs
- Mudrock Systems Characterization - Advanced Geophysical Insights
- What's Going on Down There? Clues from Produced Fluids and Proppant
- Bringing It All Together: How Reservoir Characterization Improves Stimulation and Production

Registration Now Open!

WESTIN MEMORIAL CITY
945 GESSNER ROAD • HOUSTON, TX 77024
For special room rates call before February 1st: 281.501.4300

Brand your company with the premier event designed for integrated asset teams

	Platinum Plus[1] Exclusive Sponsor $25,000	Platinum Sponsors $20,000	Titanium Plus[2,3] Exclusive Sponsor $12,500	Titanium Sponsors $10,000	Gold Plus[4,5] Exclusive Sponsor $7,500	Gold Sponsors $5,000	Silver Sponsors $2,500	Bronze Sponsor $1,000
Premium booth location	✓	✓						
Logo on Sponsorship Banners Exclusive to top 4 levels (in main conference room)	✓	✓	✓	✓				
Advertisement in Program Book	Full Page	Full Page	1/2 Page	1/2 Page	1/4 Page	1/8 Page		
Complimentary Full Registrations	5	4	4	3	2	2		
Complimentary Vendor Booth	✓	✓	✓	✓	✓	✓		
Sponsorship Ribbons	✓	✓	✓	✓	✓	✓	✓	
Recognition by level of sponsorship (Program Book, onsite signage, post show highlights/thank you in HGS Bulletin)	✓	✓	✓	✓	✓	✓	✓	✓
Recognition by level in Conference Announcements and website (logo with hyperlink)	✓	✓	✓	✓	✓	✓	✓	✓

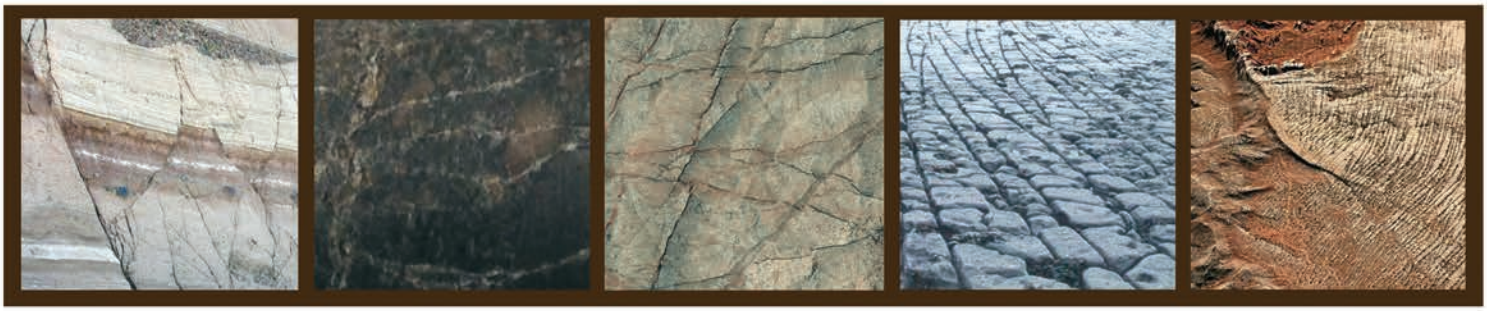
	Exclusive Sponsors	These are assigned on first come first serve basis and confirmation/payment of sponsorship monies (deposit)	
	1	Exclusive Sponsorship Title	Main Conference Sponsor
	2	Exclusive Sponsorship Title	Student Technical Poster Session Sponsor
	3	Exclusive Sponsorship Title	Networking Reception Sponsor
	4	Exclusive Sponsorship Title	Core Library Sponsor
	5	Exclusive Sponsorship Title	Lunch Sponsor

93% Rated the overall quality of the technical presentations as good or exceptional compared to other industry conferences

91% Rated the talks as applicable to their every day work

For more information and to register please visit: www.hgs.org

Applied Geoscience Conference



May 18-19 2015

Interdisciplinary Micro to Macro-scale Geomechanics

Please join us for the Houston Geological Society's premier technical conference, offering the latest breakthroughs, technical perspectives and integrated approaches to unconventional reservoir assesment.

Our 2015 program includes:

- Oral technical program includes a focus of three (3) major shale play targets.
  Half Day Session titles include Geomechanics and:
  - *Day One AM* - Large Scale Geomechanics
  - *Day One PM* - Petrophysics
  - *Day Two AM* - Microseismic
  - *Day Two PM* - Engineering
- Student posters highlighting industry supported research
- Expert panel comparison discussion after each of the four half day technical sessions

SAVE THE DATE!

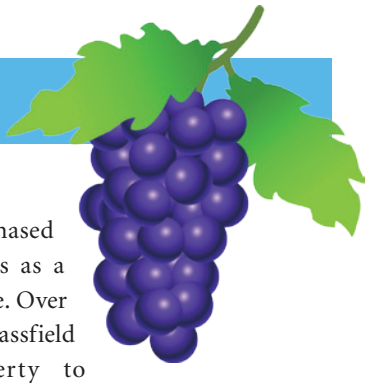
WESTIN MEMORIAL CITY • 945 GESSNER ROAD • HOUSTON, TX 77024
For special room rates call before February 1st: 281.501.4300

For more information please visit: www.hgs.org

Vintage Geology

by Michael F. Forlenza, P.G.

A Tasting of Geologically-Themed Wines



Volcano Ridge - Eruption 2005
Brassfield Estate Winery
Clearlake Oaks, California

www.brassfieldestate.com
14.3% alcohol
$19.57 retail

Scoria, ash, cinders, bombs, pumice, lapilli, tephra…these are what a geologist expects to find on the slopes of a volcano where the Earth has spewed forth molten materials from the fiery furnaces deep underground. But in some corners of the world, a geologist will also find vineyards, vineyards where the fruits of the Earth are nurtured for winemaking. The product of one such vineyard in northern California is Volcano Ridge Eruption.

The Wine

Volcano Ridge Eruption 2005 was produced by Brassfield Estate Winery located in Clearlake Oaks in Lake County, California. Called Proprietary Redwine, Eruption is a blend of the red varietals Syrah (69%), Mourvedre (18%), Grenache (5%), Petite Sirah (5%), and other grapes (3%) typical of classic Rhone varietals from southern France. This blend of red grapes produces a wine with a deep rich burgundy hue. The Syrah grape is often thought to have originated in Persia. However, recent genetic studies have shown that the grape is indigenous to the Rhone Valley. Syrah is the principal component of many renowned Rhone wines including Côte-Rôtie, Hermitage, Saint-Joseph, Châteauneuf-du-Pape, and Côtes du Rhône.

In 1973, Jerry Brassfield purchased 1,600 acres in Clearlake Oaks as a cattle ranch and wildlife reserve. Over the next three decades, Mr. Brassfield acquired additional property to accumulate 2,500 acres across both the eastern and the western sections of California's High Valley. Vineyard planting began in 2001 and a state-of-the-art winemaking facility was soon constructed. Brassfield Estate winemaking is overseen by consulting winemaker David Ramey.

The website for the Brassfield Estate Winery claims that its unique microclimates and rare diversity of soils produce grapes of uncommon quality. The bottle label states, "our high-elevation vineyard block known as *Volcano Ridge*, located on the slopes of an extinct cinder cone, is planted with syrah, mouvedre, grenache, and petit sirah."

The valley's topography has created several distinct microclimates due to the varying elevation and the prevailing west-to-easterly winds from the Pacific Ocean. Brassfield maintains vineyards on the cooler valley floor for white varietals such as Pinot Grigio and Sauvignon Blanc, while the hillside vineyards planted along the warmer ridges are used for red varietals such as Zinfandel, Syrah, Cabernet, and Merlot. Brassfield reports that excavation is underway on one of the largest wine cave systems in North America which will total 75,000 square feet when complete. Currently, 15,000 square feet of the wine cave system is finished and houses 1,500 barrels of wine.

The Volcano Ridge Eruption is "estate bottled." In the United States, "estate bottled" has a very specific definition pertaining to the way the wine is made. The federal government, through the Alcohol, Tobacco, Tax and Trade Bureau (known as the TTB), under the Department of the Treasury, sets requirements for wineries that wish to use the word "estate" on their labels. These requirements are:

- 100 percent of the wine must be made from grapes either grown on property owned or controlled by the winery. Because wineries often source some grapes from other growers – indeed, many vineyards grow grapes precisely for this purpose – this can be a tough standard to meet.
- The vineyards must be within a TTB-designated American Viticultural Area (AVA). This can present some risk to the

Vintage Geology *continued on page 37*

CALL FOR PAPERS

65th GCAGS Convention

George R. Brown Center
Houston, Texas

- New Oil and Gas Discoveries
- Unconventional Plays
- Development Field Studies
- GOM Shelf and Onshore Plays
- Salt Tectonics and Traps
- Mexico and Caribbean Plays
- Geophysical Technology
- Gulf of Mexico Deepwater
- Environmental Geology
- Coastal Geology and Surface Impact
- Geology-Geophysics-Engineering
- Portfolio Management
- Climate/Public Awareness Issues

To participate in the 2015 GCAGS Convention Oral and Poster Presentations

An abstract of up to 250 words should be submitted no later than December 13, 2014 to Technical Program Chair, Linda Sternbach (linda.sternbach@gmail.com).

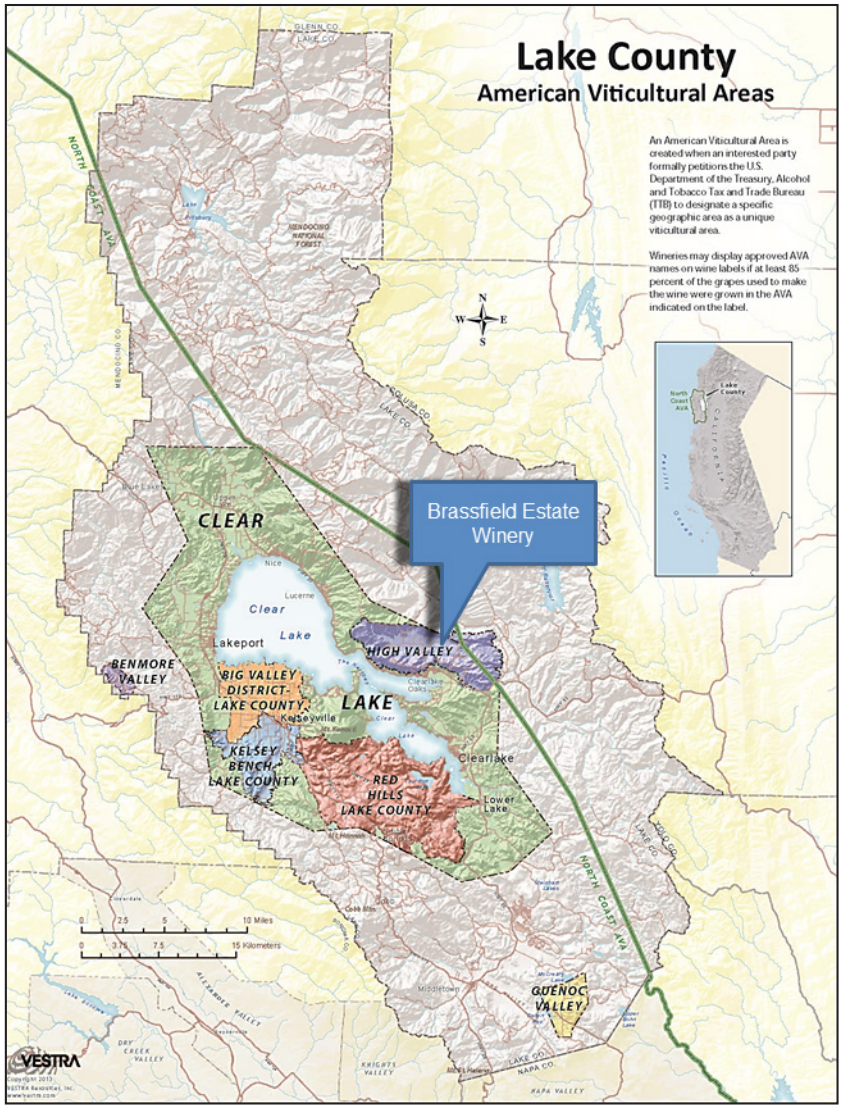
After notification of acceptance on January 20, 2015, authors submit extended abstracts (1-2 pages) or full papers up to 12 pages to the GCAGS Transactions by February 20, 2015 to GCAGS Transactions Editor, Steve Levine.

Full instructions for manuscript submissions will be posted online at www.gcags2015.com and www.gcagshouston.com

Vintage Geology continued from page 35

winemaker because sourcing the grapes from a single AVA increases the chances that bad weather can destroy an entire crop.

- The winery and the vineyard must be within the same AVA.
- All production activities must be conducted in the same facility. The winery must crush and ferment the grapes, then finish, bottle, and age the wine on their own premises, in a continuous process. The wine may not leave the premises at any time during its production. If a winery wants to use the word "estate" on their label, they may not use an off-site crush facility, for example.



The Region

The Brassfield Estate is located in High Valley in California's Coastal Range about 80 miles north of San Francisco. This wine-producing area is not as well known as the high profile wine-producing areas of Napa Valley and Sonoma Valley that lie approximately 30 miles to the south. Yet Lake County has a long history of wine production dating back to the 1850s when early settlers first began planting vineyards which flourished in the Mediterranean-type microclimates. Today, Lake County calls itself "The Undiscovered Wine Country."

Lake County surrounds Clear Lake, the largest natural lake in California. Vineyards are planted throughout the county, from the agriculturally rich valley floor at an elevation of 1,370 feet, to the rocky red volcanic slopes at more than 2,000 feet of elevation around the volcanic Mount Konocti. These elevations provide some of the coolest winegrowing areas in California resulting in a late start to the growing season. Fortunately for the grape growers, few pests can tolerate the altitude and cool climate. Summer growing conditions are suitably warm allowing the grapes to fully ripen and develop complex flavor profiles.

Lake County lies within the North Coast AVA as designated by the TTB. This large appellation covers over 3,000,000 acres (12,000 km^2) in northern California and includes many smaller sub-appellations that all share the common characteristic of having their weather affected by the cool fog and breezes from the Pacific Ocean. Brassfield Estate lies within the High Valley AVA sub-appellation. One of the newest AVAs, High Valley was designated in 2005 and covers approximately 15,000 acres of which approximately 700 acres are planted with grapes. The High Valley AVA is situated on elevations ranging from 1,600 feet (490 m) to nearly 3,000 feet (910 m).

The Geology

California's Coastal Range lies between California's central valley and the Pacific Ocean. It runs for more than 400 miles from Humboldt County in the north to Santa Barbara County in the south. The rocks of this range comprise a great variety of types and vary widely in geologic age.

The main spine of the Coastal Range north of San Francisco is composed primarily of the Franciscan Complex or assemblage. The Mesozoic Franciscan assemblage is an intensely deformed and metamorphosed mixture of rock materials with a gray-green color. These rocks are complexly folded and faulted. Due to the lack of continuous exposures and complex geometries, it is impossible to use conventional geological mapping methods to

Vintage Geology *continued on page 39*

The Seapex Exploration Conference

SEAPEX 2015

For the Industry: By the Industry

15 – 17 April 2015

Fairmont Hotel, Singapore

Lunches and Drinks included

Register before 15 January 2015 for the early bird rate of S$900

www.seapexconf.org

Register before 15 January 2015 for the early bird rate of S$900 plus enjoy SEAPEX membership until October 2015*

Technical Programme*

Social Events

Ice Breaker/Golf/Tennis

Evening Excursion/Quiz Night

- ***Networking***
- ***Farmout Forum***
- ***Posters***
- ***Petroleum Geology Course***

The SEAPEX Exploration Conference is a not-to-be-missed biennial event for upstream oil and gas industry professionals and investors.

With a line-up of more than 30 presentations from across South East Asia, SEAPEX 2015 will disseminate critical upstream knowledge, provide first-rate networking opportunities and promote investment in the region.

Support your industry and take up one of the sponsorship opportunities for SEAPEX 2015.

Please note that SEAPEX membership is required for attendance and is included in the registration fee. Sign up now and enjoy the early bird discount rate as well as the benefits of SEAPEX membership until October 2015. For details about the South East Asia Petroleum Exploration Society, visit www.seapex.org.

Place it in your diary now,

Respectfully Yours,
Peter Woodroof, Chairman

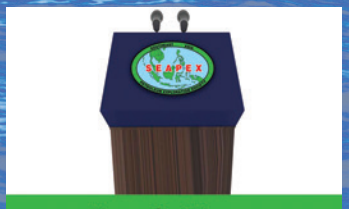
Technical Program

Sponsorship

Petroleum Geology Course

Poster Panels

Social Events



Farm Out Forum

Golf & Tennis

APSC

*For talk proposals, please contact **peter.woodroof@petrofac.com or chris.howells@tgs.com.**
See events and register online at **www.seapexconf.org**

Vintage Geology *continued from page 37*

estimate the thickness of the assemblage. However, various arguments have been made that at least 50,000 feet of vertical section are present.

Prior to the development of the plate tectonic theory, this chaotic mixture of rock types was a great mystery to early California geologists. With the understanding of plate movement, geologists determined that the processes of collision and subduction accounted for the mixing of such a wide variety of rock materials as "exotic terrains" were welded onto the North American plate.

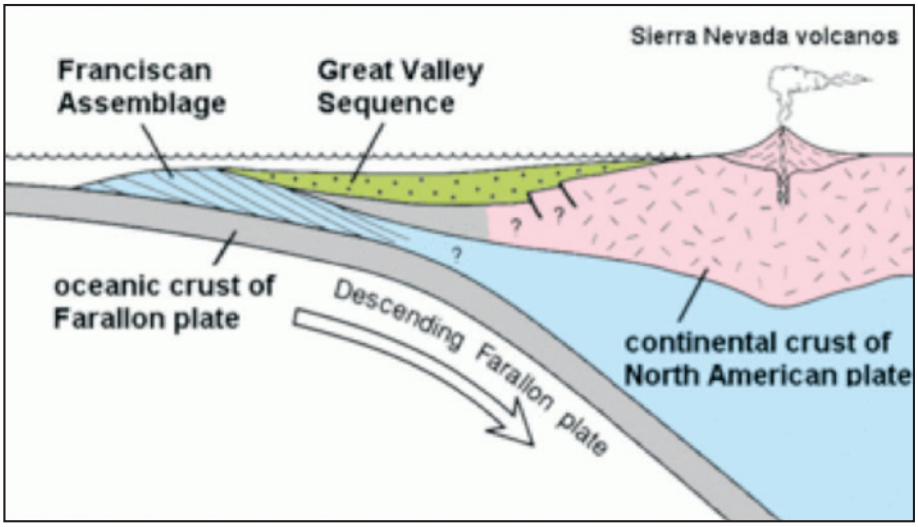


Diagram showing the depositional setting of the Franciscan Assemblage and the coeval Great Valley Sequence.

The Franciscan assemblage records over 140 million years of uninterrupted east-dipping subduction as the accretionary wedge complex grew. As the oceanic plate subducted beneath the North American continent, part of the upper section of the oceanic crust (pillow basalt) and the materials riding on the plate (chert, graywacke, shale, small islands, and sea mounts) were scraped off the upper part of the subducting plate, mixed together, partially subducted and accreted on and under the continental crust. Geologists often call such a diverse mixture of rocks a "mélange" from the French for "mixture." The Franciscan mélange is essentially a chaotic mixture of intensely sheared sandstone and shale "paste" into which are embedded blocks of basalt, chert, and graywacke along with rare exotic rocks. Due to the high level of metamorphism, Franciscan rocks are frequently referred to as metabasalt or metagraywacke.

According to the United States Geological Survey's Volcano Hazards Program, subduction in the Clear Lake area ended about three million years ago as the San Andreas transform fault propagated northward behind the Mendocino triple junction. Volcanic activity in this area started about two million years ago. Volcanic vent alignment and basin development in the Clear Lake region has been controlled by tectonic extension within the San Andreas transform fault system. Movement between the faults is the source for the pull-apart basin that created Clear Lake.

The Clear Lake Volcanics are the northernmost and youngest of several volcanic fields in the California Coastal Range. The volcanic activity dates from about 2.1 million years ago to as recent as about ten thousand years ago. Silicic lavas were the dominant type of flow and the most voluminous rock type in the volcanic field is rhyodacite. Since about one million years ago, volcanism has been localized south and east of Clear Lake. Geophysical data suggest that a large silicic magma body lies under the main Clear Lake volcanic field.

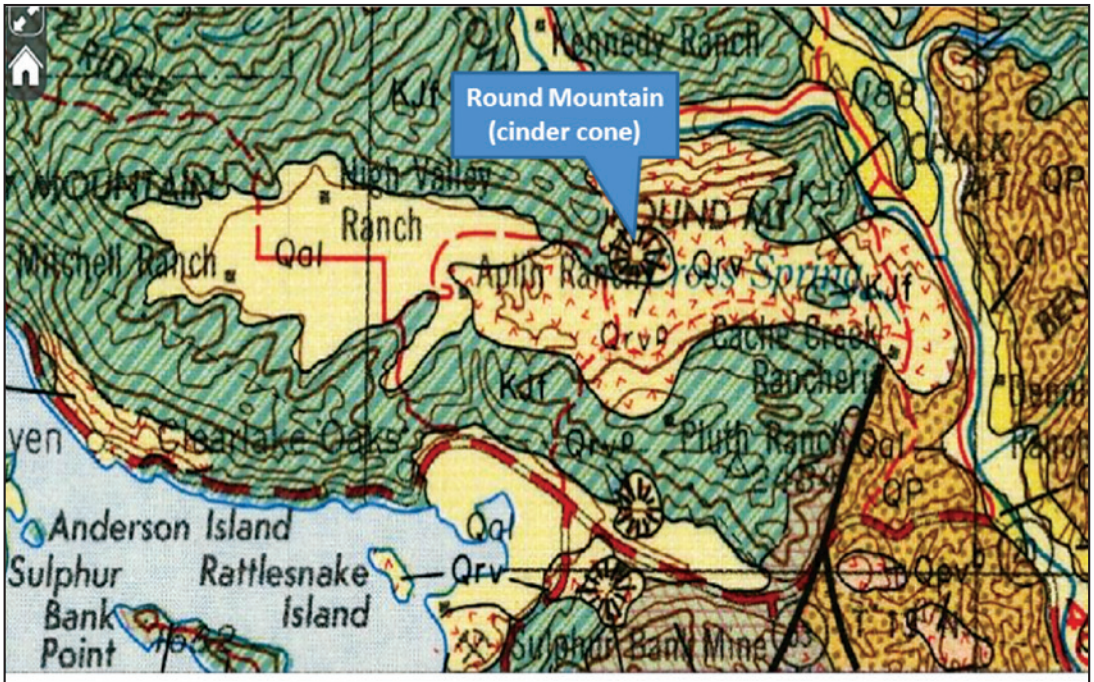
The soils in the High Valley AVA are formed on the alluvial material from the Franciscan Complex and the volcanic rocks. The soils are dominated by volcanic material because they are more easily eroded than the resistant Franciscan rocks. These rich, well-drained soils are particularly well suited to grow wine grapes. Many important wine regions have predominantly volcanic soils including parts of Napa Valley, Chile, France, Germany, Italy, and New Zealand. But just what makes the volcanic soils important in the growing of these grapes?

According to Professor Tim Dixon, a University of Miami marine geologist and oenophile, volcanic materials "upon eruption are rapidly chilled to glass, so the minerals are in a metastable state. Hence, they can rapidly break down – quickly in a geologic sense, which means tens to hundreds of years. Ultimately, this process releases potash and phosphate, two critical nutrients for plant health which are normally in short supply." Volcanic soils are often enriched in minerals with abundant calcium, iron, and magnesium. Thus, volcanic soil has favorable soil chemistry with important nutrients readily available for plant uptake.

Volcanologists from University of California-Santa Barbara note that people around the world will risk heavy ash fallout and lava flows to grow crops and raise livestock in these potentially dangerous areas because the soil is so mineral-rich and bountiful. For example, except for the volcanic area near Naples, farming in southern Italy is difficult because of the prevalent limestone. Naples, however, has the noted volcano Mount Vesuvius. Two eruptions, 35,000 and 12,000 years ago, produced a mineral-

Vintage Geology *continued on page 41*

Vintage Geology continued from page 39



Location of Volcano Ridge – Eruption vineyards on Round Mountain. Detail from Geologic map of California : Ukiah sheet, California Division of Mines and Geology, Author(s): Jennings, C.W., and Strand, R.G., Third Printing 1992. KJf – Franciscan Formation (Cretaceous – Jurassic), Qrv^{p} – Recent volcanic, pyroclastic rocks.

rich soil that still is considered Italy's best agricultural land. The University of California-Santa Barbara volcanologists note that "volcanic rocks make some of the best soils on earth because they… have a wide variety of common elements and chemically are readily separable into elemental components."

Professor Dixon also noted that volcanic soils provide important drainage. "Grape vines hate wet feet, and volcanic terrains are usually sloped, hence drainage is good." Winemakers will quickly tout the benefits of soils where the vines must struggle and send deep roots to reach water and mineral sources. These conditions establish stronger root systems that make for heartier plants and fruit that is less fleshy with more concentrated juice and flavor.

Brassfield's Volcano Ridge Vineyard covers 85 acres on the slopes of the cinder cone called Round Mountain. At elevations between 1900 and 2200 feet, the vines of the red varietals struggle with cool temperatures and the rapidly drained soils. The cool temperatures allow for a prolonged maturation of the grapes and therefore a greater intensity of flavor. For a winemaker, stressed vines typically produce reduced crop yields but more elegant fruit, more concentrated flavors, and greater complexity and structure.

Tasting Notes

The Volcano Ridge Eruption 2005 was produced from a blend of grape varietals sourced in the High Valley AVA where the soils are primarily composed of volcanic materials. Does this terroir express itself in the product? Can the volcanic soils provide the grapes with a distinguishable characteristic? Our tasting panel investigated.

The panel found this dark, purplish-red wine to be rich and full-bodied with powerful and intense flavors of ripe red fruit such as black cherries, blueberries, and currant. Comments included: "rustic, yet elegant," "linear," "explosive," and "very good, but some structural weakness." Some panelists noted flavors of dark chocolate, clove, tobacco, spice, coffee, and oak. These tastes are often related to the wine's tannins. The tannins in the Eruption are soft and mouth-filling, although one panelist called them "flabby." The body of the wine is heavy and unctuous, with a pleasing mouth-coating sensation and a long finish.

But what about the geology? One would expect the ready availability of metallic elements in the soil to be observed in the product. Well, there is indeed a minerality to the wine…earthy, dusty, maybe cindery? One panelist tasted graphitic, metallic, and stony qualities.

The 2005 Eruption wine is getting a bit old and is probably no longer available in stores. But do not fret; Brassfield has released more recent editions of Eruption each year for your geological drinking pleasure. Cheers. ■

HGS/PESGB 13th International Conference on African E&P – "Africa: A World of Opportunities"

The 13th of the series of Africa Conferences was convened 9-10 September in Houston with approximately 450 in attendance at the Westin Houston, Memorial City Hotel. The joint effort by the Houston Geological Society (HGS) and the Petroleum Society of Great Britain (PESGB) has become recognized as a leading technical E&P forum on Africa, alternating its annual venue between London and Houston. The HGS-PESGB African Conference covers all aspects of African E&P, with particular emphasis on new ideas for plays and prospects, the geology of the continent and its conjugate margins, and application of emerging technologies. Participants included representatives of operators, service companies, consultants, governments and academia. The two-day program included 30 talks, 25 technical posters and 40 vendors' exhibits. In addition to the two-day conference, a one-day short course: "Petroleum Basins of Sub-Saharan Africa", given by Duncan Macgregor, was well attended. Duncan graciously directed that any profits from the course should be donated to the HGS scholarship funds.

The HGS-PESGB African Conference covers all aspects of African E&P, with particular emphasis on new ideas for plays and prospects, the geology of the continent and its conjugate margins, and application of emerging technologies.

Oral presentations at the conference were organized in 6 thematic sessions; the following is a summary of some of the highlights:

Session 1: Regional and Overview

Africa continues to provide more than its share of discoveries with 13 billion barrels oil equivalent (Bboe) added in the past two years; about 20% of world totals according to IHS Energy. Worldwide drop-off of seismic acquisition is worrisome and makes one ask "Where will the next generation of discoveries come from?" Of the new mega plays, some have yet to start production, i.e. East Africa deep water gas, and East Africa Rift-related plays in Uganda and Kenya. Some of the deep water plays may not be sustainable at oil prices below $100/bbl. However, new plays continue to emerge, these days typically led by smaller companies. Social programs are becoming more important in the communities where oil and gas are sought. Some examples of existing organizations that help Industry with social responsibility include the AAPG Publication Pipeline and the rapidly-growing Africa Region of AAPG.

Session 2: North and Northwest Africa

Finding adequate reservoir rock has challenged success in offshore NW Africa. Extending the Cretaceous fan play northward from the Equatorial Transform margin along the coastal countries of NW Africa continues to be problematic, although regional studies underway at North Africa Research Group at Univ. of Manchester and Delft Univ. of Technology are aimed at improving the odds. One of the more interesting approaches to discussing the exploration of this area was used by Ian Davison of Earthmoves Ltd., drawing analogies to the progression of the early maritime Portuguese explorers in their quest southward from Gibraltar to the Gambia (1415 -1455) as he presented an overview of the plays and some of the recent prospecting results in offshore NW Africa.

Session 3: East Africa

With 200 trillion cubic feet of gas (Tcfg) discovered in offshore Mozambique and Tanzania and nearly 2 billion barrels of oil (Bbo) found so far in the onshore rift basins in the past 10 years, and the first offshore oil discovered last year (at Sunbird, offshore Kenya), what more can be expected from East Africa? Two authors presented their interpretations of giant undrilled anticlines: Bob Bertagne (Marex), described prospective features offshore in the Mozambique Channel near the Davies Ridge and Edward Prescott (Afren) discussed the "El Wak" anticline onshore Kenya. There is a lot left to be drilled offshore, in the coastal basins and in the onshore rift basins of East Africa

Session 4: Rift Basins and Pre Salt

This thematic session, conceived and organized by Scott Thornton, addressed some of the methods to improve understanding and prospecting for traps associated with rifting along continental margins over transitional or continental crust. Ian Davison shared some of his experiences in Brazil's Reconcavo basin with excellent examples of syn-rift and pre-rift targets that sometimes are not readily seen on seismic data.

Perhaps the best attended talk was presented by Helen Doran (Ophir) entitled "New insights into pre- and post- salt of the North Gabon Basin," providing a case history by the operator of what has been learned from their recent drilling and a re-examination of previous well data in a new light. In particular, recent drilling has revealed an anomalously hot local thermal regime and recognition of an Early Albian(?) source sequence. Future potential exists where both pre- and post-salt plays are juxtaposed establishing a rich play portfolio.

HGS/PESGB 13th International Conference *continued on page 45*

 continued from page 43

Peter Gibbs (Wealdon Exploration) presented an update of his reconstructions and paleogeographic maps of the South Atlantic (first presented at the Africa Conference in 2003). They provide some historical perspective on plays that have emerged and what has been learned over the past decade. Successful plays that have emerged with discoveries in the South Atlantic during this period include: Falklands at an estimated 1 Bbo?, deep water Tano Basin Cretaceous fans with an estimated 7 Bboe, deep water Santos Basin Pre-Salt with an estimated 40 Bbo and deep water Angola Pre-Salt with an estimated 2 Bbo.

Session 5: West Africa

Allen Brown (Anadarko) provided an update of "The Campanian Quartz Claystone Conundrum of the African Transform Margin", which refers to an unusual very fine-grained quartz lithology that looks like claystone , in cuttings and cores, yet has a log response like a reservoir. Thought to be aeolian when first reported at AAPG in 2010, the origins of the sequence are not yet fully understood. However, it is important to adequately sample and conduct detailed side wall core analysis to recognize this important sealing lithology versus misidentifying it as a porous reservoir sand.

Four excellent talks reviewed insights for new plays in separate West Africa basins, each presented by one of the seismic providers: Harper Basin Offshore Liberia by Peter Conn (TGS), the Oligocene Deepwater System – Offshore Niger Delta by Obinna Chudi (Heriot Watt Univ. and Schlumberger), Offshore Congo by Patrick Coole (PGS) and Namibe Basin in Angola by Deepak Rathee (Schlumberger). These excellent talks, based on the latest seismic data and interpretation techniques, provided a fertile resource for recognition of emerging plays that could fit your portfolio. These talks underline the contribution of vendors in the development and enhancement of the "toolkit" needed for exploration as well as providing a continued supply of regional seismic coverage.

Session 6: South Atlantic Conjugate Margins

Studies of the divergent conjugate margins of the South Atlantic over the past decade and more recent analyses of the Red Sea suggest that the central part of the Red Sea is a good analogue for the central segment of the South Atlantic, represented by Espirito Santo to Santos Basins off Brazil and from Gabon to Angola off West Africa. These margins are characterized by a major salt basin development with the first marine ingressions in the Late Aptian according to Webster Mohriak, a professor at the University of Rio de Janeiro. Dr. Mohriak has a long and distinguished career in the study of the South Atlantic and has produced two landmark book publications: Atlantic Rifts and Continental Margins published by American Geophysical Union in 2000, and Conjugate Divergent Margins published in 2013 as Special Publication 369 by the Geological Society of London.

Two papers described concepts of the tectonic evolution of the rift, sag and salt of the Central South Atlantic (James Kiely, Maersk) and a gave a detailed comparison of the pre-salt successions in the conjugate Campos and Southern Kwanza Basins, noting the differences in reservoir facies (Madeleine Raven, Maersk).

A joint presentation by Craig Schiefelbein and Bill Dickson discussed the principal oil families of the South Atlantic in relation to their "terroirs", those special characteristics that the geography, geology and climate express in the products.

Conjugate margin seismic reconstructions, presented by Karyna Rodriguez (Spectrum, UK), pointed out that the inherent asymmetry of rifting and rift-fill processes reduce the expectation of identical-twin geologies in conjugate basins. However, despite the asymmetry, judicial conjugate margin reconstructions can indeed provide new exploration ideas and useful risk reduction on sensibly selected hydrocarbon play parameters in conjugate pair basins.

The session was closed by a review of reservoir rocks of the South Atlantic Transform Margins by Anne McAfee (Core Laboratories UK) who concluded that core data from the Brazil and Africa basins reveal that remarkably similar reservoir facies are preserved in the Cretaceous basins, though sedimentation patterns and diagenetic trends are complicated by the presence of locally significant carbonates and volcanic complexes on the Brazil margin. Anne cautioned that detailed re-examination of biostratigraphic data is very important in this setting where steep shelf margins with abundant opportunity for sediment erosion from the shelf and bypass can introduce older fossils into the deep marine setting where industry is presently drilling for deep water fans.

Poster Session

Approximately 25 posters were on display for the two day session, among them numerous student posters. The student posters were judged by a panel of experienced geoscientists and prizes awarded as follows:

1st Patrick Loureiro, University of Houston
Review of Lacustrine Carbonate and Travertine Reservoirs in South America and Africa Rift Basins.

2nd Naila Dowla, University of Houston
An Isostatically-corrected Top of Oceanic Crust Map for the Rifted Passive Margin of Mauritania, Northwest Africa.

3rd Derek Scott, University of Houston
Comparison of Rock Types in Modern Watersheds of Equatorial West Africa to Quality of Sandstone Reservoirs in Offshore Basins.

HGS/PESGB 13th International Conference continued on page 47

HGS/PESGB 13th International Conference *continued from page 45*

Exhibits

Technical contributions and wares of service companies, consultants and vendors were on display in 40 vendors' exhibits. Receptions, meals, coffee breaks and entertainment also took place in the exhibits area. This annual "show" provided a targeted audience of petroleum industry professionals interested in Africa.

Sponsors:

The excellent quality of the venue, food and refreshments is only possible with the contributions of sponsors and we are grateful for their support:

- Van Dyke Energy
- EMGS
- Casmar Corp.
- FEI
- Global Pacific
- Global Geophysical
- Lynx Information Systems
- Schlumberger
- Mubadala Petroleum

Summary

The technical program of talks, posters and exhibits provided a great opportunity for one to have, in a relatively short two-day session, an overview of what's happening in Africa. With a focus on new play ideas, as well as opportunities to meet and network with others interested in Africa, the conference is an annual gem. The next opportunity will be on 3-4 September, 2015 in London when the series reconvenes for the 14th PESGB/HGS Conference on African E&P. Submissions for talks and posters are welcomed now and should be submitted no later than 15 March 2015. See www.pesgb.org.uk for details.

The conference proceedings book of the program and short abstracts was distributed at the conference along with a CD that also includes the extended abstracts for many of the talks and posters. Copies of the book and CD can be requested from the HGS Office.

Thanks are due to the organizing committee, presenters, sponsors, exhibitors, session chairs, office staff, volunteers, HGS officers and Board of Directors for making this another successful event. ■

Directory of Oil Company Name Changes

24th Edition (April 2014)

New Edition

A new 24th edition, of the HGS publication, "Directory of Oil Company Name Changes," is now available through the Bureau of Economic Geology. This publication is a cross-referenced list of domestic oil and gas, exploration and production companies that have sold major assets or have changed their names due to a merger, acquisition or reorganization. The purpose of this directory is to provide an oil company road map that may assist geologists in tracking down logs, samples, test information, cores, paleo, drilling reports, production histories and other well data that may be obscured by these numerous name changes.

The cost of the directory is $20.00 and it can be obtained from the BEG.
The contact information is as follows:
Bureau of Economic Geology
University of Texas in Austin
Attn: Publication Sales
University Station, Box X
Austin, Texas 78713-8924
Phone: (888) 839-4365 • www.beg.utexas.edu

Lower Tuscaloosa Trend: Request for Information

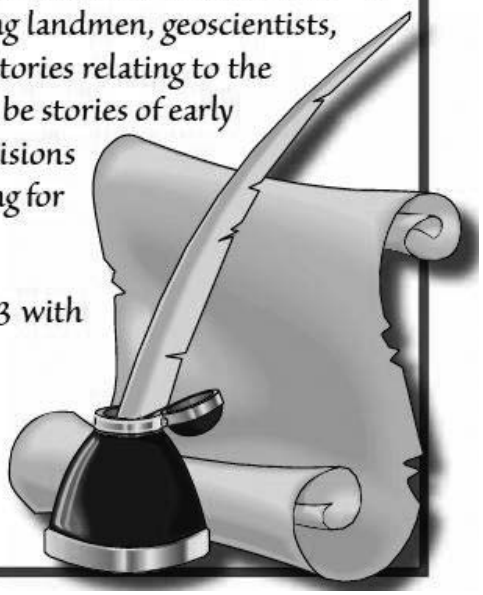
I am the Historian for the Gulf Coast Association of Geological Societies (GCAGS). My current history project is a 40th anniversary paper, or possibly a more ambitious publication, on the Lower Tuscaloosa Trend of South Louisiana.

This project will not be a technical paper, but instead a collection of "recollections" of those who worked the trend in the early days. I am contacting landmen, geoscientists, engineers, and others, soliciting a few paragraphs or pages of stories relating to the early exploration and discoveries within the trend. These can be stories of early well-sitting, key events, seismic activity, leasing, important decisions at meetings, technological breakthroughs, etc. I am also looking for photographs and newspaper articles.

Please contact me at spencerj320@gmail.com or 281-731-5823 with any questions or if you can help with this endeavor.

All the best,

Jeff Spencer



A Look Back in Time

By Ken Nemeth, President

For this month's look back in time I decided that I would look at the 1964, 1967, and 1971 photo directories to see what they hold.

There was a surprise for me in the 1964 directory, several surprises, in fact. Alfred Bentz is listed amongst the Honorary Life members of the society. Based on the 1962 and 1964 directories, this narrows his recognition to the latter half of 1962 through the first half of 1964. A close examination of every *Bulletin* starting from January 1962 found a note in the January 1963 *Bulletin* that noted his presentation date. Alfred Bentz received Honorary Life Membership in October, 1962 upon the recommendation of Paul Weaver. Dr. Bentz received his HLM award in recognition of his distinguished contributions on the subject of Salt Domes.

A second surprise was the absence of some honorees from the directory. Alexander Deussen (General Chairman of the first three AAPG conventions held in Houston) and Elias Sellards, two of the first four Honorary Life Members, did not make the listing. They weren't listed in the 1962 directory either. However, they are listed in the 1956 directory. Clarence Moody didn't make the listing although he is listed in the 1958 directory and is recognized as an Honorary Life member in the "In Memoriam" section of the 1964 directory. Poor Mr. Ben Belt has yet to be listed although he received his recognition in 1960. The 1971 directory only lists eight Honorary Life members. Perhaps the directory only listed living members.

The "In Memoriam" section of the 1967 directory lists Alfred Bentz (not recognized as an HLM), Alva Ellisor, and Paul Weaver. The 1971 directory "In Memorium" section lists Olin Bell, Wayne Bowman, and George Sawtelle, although only George is recognized as an HLM. I received an unexpected surprise when I encountered Mr. Carlton Speed on the list. Remember that Mr. Speed was responsible for the AAPG Convention train for many years. The earliest birth date listed for those members in the "In Memoriam" section was 1884. Many members had unknown birth years. The youngest birthdate was 1931. The directory recognized people who had died between 1967 and 1970.

Many of the Life Members were still living and you can see their pictures in the respective directory. Of note to some people might be pictures of these members: Bud Adams, Max Bornhauser, Gerald Cooley (bowtie and all), John De Menil (Schlumberger Director and Houston museum fame), Anne Frank, William Gillingham (President Schlumberger Well Survey Corp.), Michel Halbouty, Bill Howell, Rufus Le Blanc, Carlton Speed (our friend from the convention train), and Gene Van Dyke (friend to the Africa Conference).

The 1962 directory interspersed advertising amongst the pictures of the HGS and GSH members. A variety of companies offered such things as geosonic phase blasting (patented), king winches, aeromagnetics, and the usual suspects of the oil patch. The major employers of the members were still consultants, independents, and Humble Oil and Refining. Members included presidents, corporate directors, accountants, technical secretaries, and school teachers. There are a lot of past HGS presidents that look 52 years younger in that directory.

One last thing I noticed in the 1962 directory is the change in official (fiscal) year. It looks like HGS began its July 1 to June 30 operating-year in 1958. The layout suggests that the 1958-59 officers served for 18 months!

The 1967 directory still omitted the four Honorary Life Members missing from the 1964 directory. One can see that someone named Martin Cassidy served as HGS Treasurer in 1967-68 (see page 43). A fellow by the name of John Amoruso has his first picture in the photo directory. I saw many names of people that I have done business with over the years. There is a Denny Bartell, but not a Larry. I saw the recruiter from Humble Oil who told me that they weren't going to hire me; he just wanted to talk to me because he knew my thesis supervisor at UT. You need to see the ad for Shell on page 26, the scallop, not the pecten. Lane Wells had a full page ad on page 40. (Where did they end up, Paul Babcock?) My friend Wayne Dirks didn't wear glasses. If the Ed Heath I know from Dallas was in Houston in 1967, I wouldn't have recognized him.

Patsy Jo Hockaday Jarboe was an HGS member. She taught Earth Science in the Spring Branch School district. She had a degree from Tulane University of Louisiana. You can find a picture of James O. Lewis on page 103. He received the first HGS Distinguished Service Award. A long-gone friend can be found on page 121, Harry Otell. I shared many an oilfield tennis match with Harry. Take a look at Jim Ragsdale's picture on page 128! Martha Lou Shirley can be found on page 141 (today she is Martha Lou Broussard). John Suman (the HGS president for its first two years) was still alive and working as a consultant. He can be found on page 147.

The company index comprises 26 pages. At a glance, the largest employers are consultants, independents, Humble/Esso, and Shell. Out of curiosity I looked at Schlumberger's roster, it included the Chairman of the Executive Committee, an Executive VP, a VP in New York, a VP of Sales in Houston, and 7 managers of its listed 27 members. I wonder what that is today. The Executive VP was later honored as an HLM.

A Look Back in Time *continued on page 51*

HGS Welcomes New Members

New Members Effective September 2014

ACTIVE MEMBERS

Christopher Artell
Steven Braun
Ted Cross
Ling Duan
Dustin Dunlap
Debra Gomez
Sam Won Ham
Ashley Howell
Michael Joseph
Ray Levey
Ye Li
Krystine Miller
David Quintanilla
Karla Rios
Megan Salisbury
Peter Soto-Kerans
Ali Steullet
Leah Stewart
Jacqueline Strange
Matt Walsh
Jennifer Wilson
John Witner
Hongxiu Zhou

ASSOCIATE MEMBERS

Michael Jaskowiak
Anne Leonard
Luke Wilkens

EMERITUS MEMBERS

Robert Johnson
Eric Jorgeson
John Parrish

STUDENT MEMBERS

Caitlin Altomare
Rania Aql
Shantel Cole
Elita De Abreu
Blake DeBrock
Magaret (Meaghan) Dice
Nur Koyuncu
Diana Krupnik
Kevin Liner
Matthew McBride
Allison McKeown
Alexander Minett
Andrew Moodie
Oloruntoba Ogundayomi
Davidson Okoko
Matt Paquette
Aamir Rafiq
Khurram Rafiq
Rupsa Roy
Nathan Womack
Tuo Zhang

Welcome New Members

A Look Back in Time continued from page 49

Out of curiosity, there were 19 Honorary Life Members as of 1970. The 1971 directory lists 8. Five on that list are in the directory, three are not, and twelve HLMs are not recognized. There are 37 future HLM members in the 1971 directory. We have honored 76 members with Honorary Life membership. Twenty of those members appear to have joined HGS after 1971. Thirty HLM members are still alive today. I am going to try to collect pictures for the 76 members and see about creating a framed display for them. It would be nice to have pictures of all the Honorary Life members and other award winners for the 100th anniversary of HGS to be celebrated in 2023.

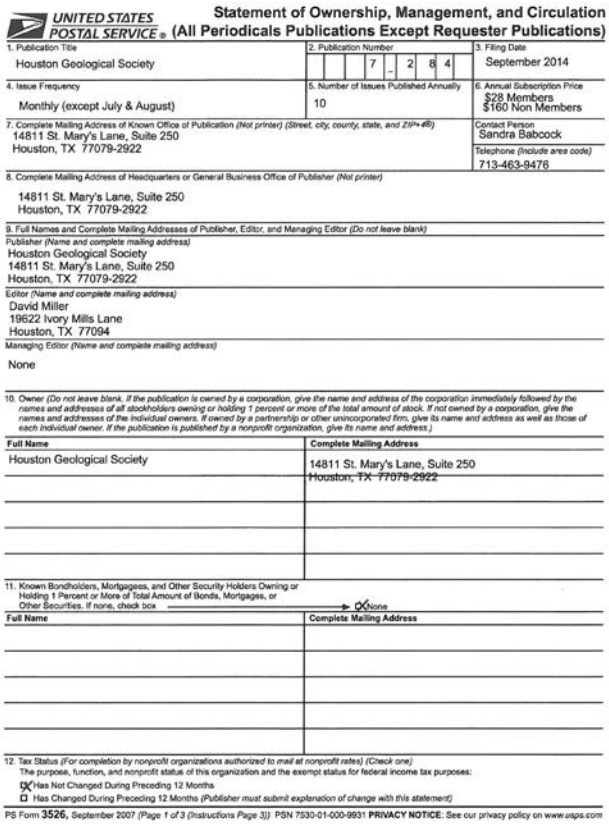
The history listed in the 1971 directory indicates that the Constitution and Bylaws were amended in 1969. John Rouse from Mobil was elected VP of the newly formed Professional Division of AAPG. Other notes in the 1971 directory show that Martha Lou Shirley is now Martha Lou Broussard and was responsible for editing *The Holocene Geology of the Galveston Bay Area*.

Bud Adams is still an HGS member. Baroid was a division of National Lead (http://en.wikipedia.org/wiki/NL_Industries, although I could not find any good historical link for Baroid). Anne Frank, a Senior Accountant at Teledyne Exploration Co. is still a member (page 78). There was a geophysicist at Humble named Gabro and another named Slate. They did not work in the minerals division. M. King Hubbard can be seen on page 108. This is the first time I recall seeing Larry Jones listed in the directory; he was with Occidental in 1971. A very young Jeff Lund can be seen on page 134. Bob Schrock who proved to be an interesting business partner while I was with Browning Oil in Dallas can be found on page 200. A friend and mentor, Elgean Shield, appears on page 205. I think that Elgean has two houses, one to live in and one in which to do geology!

The Esperson Building seemed to be a popular location for independents in 1971. The company listings covered 39 pages. Consultants used four pages; Humble/Esso used three; Independents two; Retired 1 and one-half. The self and self-employed must be listed under Independents. Shell takes up nearly one page. You can still see the positions and titles of our members. They included presidents, vice presidents, managers, chiefs, owners, and partners. And there were a whole lot of Indians!

The photo directories are a great trip down memory lane. I have found "young" business associates, members that I served with on the Shrimp Peel Committee in the eighties, future friends, and friends from the past. Drop by the office and look at these sometime. It's a shame more people don't supply pictures for the online photo directory, which I think was last printed in 1980.

Until next month and another look back in time. ■



UNITED STATES POSTAL SERVICE® **Statement of Ownership, Management, and Circulation (All Periodicals Publications Except Requester Publications)**

1. Publication Title	2. Publication Number	3. Filing Date
Houston Geological Society	7 - 2 8 4	September 2014
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Monthly (except July & August)	10	$28 Members $160 Non Members

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4®)
14811 St. Mary's Lane, Suite 250
Houston, TX 77079-2922
Contact Person: Sandra Babcock
Telephone (Include area code): 713-463-9476

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer)
14811 St. Mary's Lane, Suite 250
Houston, TX 77079-2922

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)
Publisher (Name and complete mailing address)
Houston Geological Society
14811 St. Mary's Lane, Suite 250
Houston, TX 77079-2922
Editor (Name and complete mailing address)
David Miller
19622 Ivory Mills Lane
Houston, TX 77094
Managing Editor (Name and complete mailing address)
None

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

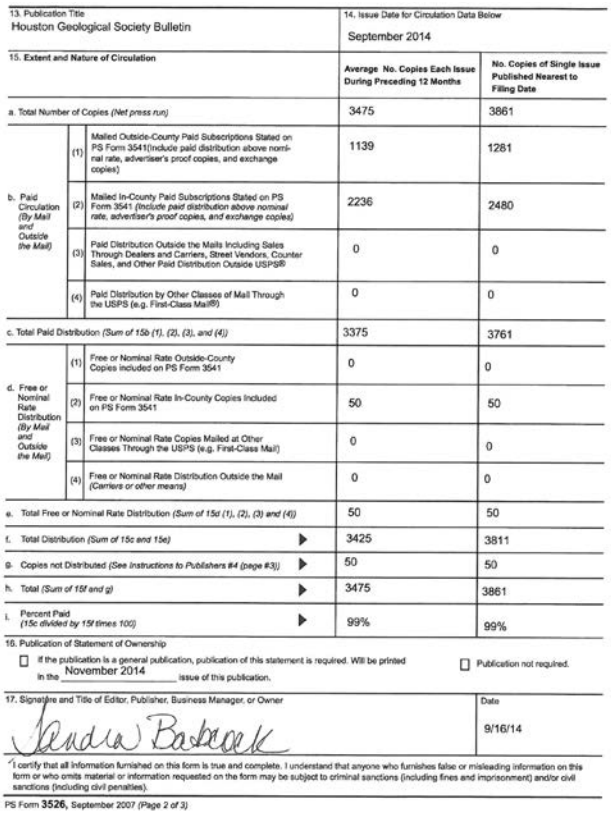
Full Name	Complete Mailing Address
Houston Geological Society	14811 St. Mary's Lane, Suite 250 Houston, TX 77079-2922

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☒ None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☒ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526, September 2007 (Page 1 of 3 (Instructions Page 3)) PSN 7530-01-000-9931 PRIVACY NOTICE: See our privacy policy on www.usps.com



13. Publication Title: Houston Geological Society Bulletin	14. Issue Date for Circulation Data Below: September 2014	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	3475	3861
b. Paid Circulation (By Mail and Outside the Mail) (1) Mailed Outside-County Paid Subscriptions Stated on PS Form 3541(Include paid distribution above nominal rate, advertiser's proof copies, and exchange copies)	1139	1281
(2) Mailed In-County Paid Subscriptions Stated on PS Form 3541 (Include paid distribution above nominal rate, advertiser's proof copies, and exchange copies)	2236	2480
(3) Paid Distribution Outside the Mails Including Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Paid Distribution Outside USPS®	0	0
(4) Paid Distribution by Other Classes of Mail Through the USPS (e.g. First-Class Mail®)	0	0
c. Total Paid Distribution (Sum of 15b (1), (2), (3), and (4))	3375	3761
d. Free or Nominal Rate Distribution (By Mail and Outside the Mail) (1) Free or Nominal Rate Outside-County Copies included on PS Form 3541	0	0
(2) Free or Nominal Rate In-County Copies Included on PS Form 3541	50	50
(3) Free or Nominal Rate Copies Mailed at Other Classes Through the USPS (e.g. First-Class Mail)	0	0
(4) Free or Nominal Rate Distribution Outside the Mail (Carriers or other means)	0	0
e. Total Free or Nominal Rate Distribution (Sum of 15d (1), (2), (3) and (4))	50	50
f. Total Distribution (Sum of 15c and 15e) ▶	3425	3811
g. Copies not Distributed (See Instructions to Publishers #4 (page #3)) ▶	50	50
h. Total (Sum of 15f and g) ▶	3475	3861
i. Percent Paid (15c divided by 15f times 100) ▶	99%	99%

16. Publication of Statement of Ownership
☐ If the publication is a general publication, publication of this statement is required. Will be printed in the November 2014 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Sandra Babcock — Date: 9/16/14

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

PS Form 3526, September 2007 (Page 2 of 3)

Government Update

*by **Henry M. Wise, P.G.** and **Arlin Howles, P.G.***

If you'd like the most up-to-date Texas rules, regulations, and governmental meeting information we direct you to the HGS website to review The Wise Report. This report, which comes out as needed but not more often than once a week, offers the most up-to-date information that may be of interest to Texas geologists.

AGI Geoscience Policy Monthly Review (July 2014)

House hearing on EPA Veto Authority in Clean Water Act

On July 15, 2014 the House Transportation Subcommittee on Water Resources and Environment held a hearing to discuss the Environmental Protection Agency (EPA)'s permit veto authority under the Federal Water Pollution Control Act, otherwise known as the Clean Water Act. On June 12, 2014 Chairman Bob Gibbs (R-OH) introduced the Regulatory Certainty Act (H.R. 4854) 0to amend the Clean Water Act, limiting the veto authority of the EPA.

Chairman Gibbs stated that the EPA can veto a project even if it hasn't violated a permit issued under Section 404, which regulates discharge of dredged or fill material into waters of the United States. Chairman Gibbs called the situation a "property rights issue." In response, Ranking Member Timothy Bishop (D-NY) cited statistics that the EPA has only used its veto authority 13 times in the 2.5 million permits issued since the Clean Water Act was passed in 1972.

The majority of the witnesses, representing academia, industry, and nongovernment organizations, voiced objections to the alleged expansion of EPA authority. They stated that the process is a burden on transportation projects and new infrastructure, and has grown longer and more complicated, generating more civil suits. Only Mr. Parenteau, professor of law at Vermont Law School, contended that the EPA has interpreted its veto power exactly as it was stipulated in 1972. He contended that the EPA's ability to veto a permit before, during, or after allocation "has been written into the rule since the beginning." He stated that it has been exercised very rarely, with positive results.

The bill was approved by the committee and will now move on to the House

Senate Energy and Natural Resources Committee Holds Field Hearing to discuss Outer Continental Shelf Oil and Gas Production

The Senate Committee on Energy and Natural Resources held a field hearing on July 7, 2014 in Lafayette, Louisiana, to discuss opportunities for increasing oil and gas production, particularly on the Outer Continental Shelf (OCS) or the submerged lands lying greater than three miles offshore of most of the United States.

Chairwoman Mary Landrieu (D-LA) affirmed her commitment to expanding offshore drilling to include federal waters off the East and West Coasts and Alaska. Currently, the Bureau of Ocean Energy Management oversees OCS leasing for oil and gas development. These areas provide almost a quarter of domestic oil production and seven percent of domestic gas production.

Sen. Landrieu cited the small percentage of the OCS currently available for drilling—two percent—as evidence for the growth potential in this industry. Kent Saterlee III, Manager of Offshore Regulatory Policy at Shell Exploration and Production Company, claimed opening these waters to OCS production would create over 1 million new jobs by 2020.

Chairwoman Landrieu and Ranking Member Lisa Murkowski (R-AK) have introduced the Fixing America's Inequities with Revenue (FAIR) Act (S. 1273), intended to increase oil and gas profits for states bordering the Gulf of Mexico. The FAIR Act would remove revenue caps and increase revenue shares for Gulf States.

The hearing was the first in a series of field hearings the committee will be holding across the country.

President Obama Announces 3D Elevation Program

President Obama announced the launch of the 3D Elevation Program (3DEP) on July 16, 2014. The 3D Elevation Program, a partnership program led by the U.S. Geological Survey (USGS), aims to map the lower 48 states, Hawaii, and the U.S. territories with a laser technology called lidar (light detection and ranging) in an eight-year period. Alaska will be mapped with a technology called ifsar (interferometric synthetic aperture radar), which better maps terrain through cloud cover. The President requested $13.1 million for the 3DEP program in his fiscal year (FY) 2015 budget request.

The Federal Emergency Management Agency (FEMA) and the National Oceanic and Atmospheric Administration (NOAA) are primary partners in 3DEP, but the National Enhanced Elevation Assessment estimates that 34 federal agencies would benefit from using the resulting data. The assessment predicts that 3DEP has the potential to generate $13 billion in new benefits annually through applications that include flood risk management, precision agriculture, and aviation safety. USGS and its partners

plan to collect data for areas at high risk for natural disasters on a continuing basis.

Data from 3DEP are considered highly accurate, with resolution two or three times better than average existing data. This improved accuracy is important to better identify flood risks, landslide hazards, and coastal erosion. In the past, lidar data has been a critical tool for USGS scientists; for instance, it allowed them to identify a surface rupture of a fault that led to the redesign of a $735 million bridge over Washington's Tacoma Narrows. Newer, more accurate data from 3DEP could allow for similar successes.

USGS held a congressional briefing on July 25, 2014 to explain the goals and applications of 3DEP.

House Subcommittee Hearing on the National Earthquake Hazards Reduction Program

A subcommittee of the House Science, Space, and Technology Committee (SSTC) met on July 29, 2014 to review the National Earthquake Hazards Reduction Program (NEHRP). Committee members and witnesses agreed that reauthorization for NEHRP, which expired in 2009, is critical. Witnesses explained that NEHRP would be more effective if it were authorized, not just implied through appropriations, and emphasized that although earthquakes are inevitable, their effects are not.

Ranking Member Daniel Lipinski (D-IL) inquired about the involvement of social science in earthquake preparation and response. Roy Wright from the Federal Emergency Management Agency (FEMA) explained that the biggest weakness in earthquake mitigation is the public's poor understanding of risk and belief that bad things won't happen to them.

Many members of the committee asked how the United States compares to countries like Japan and New Zealand in earthquake preparedness. Witnesses explained that most American building codes are similar to those of these other countries, but that there are many old buildings in the United States that could be destroyed in a fashion similar to the destruction of Christchurch, New Zealand, in the 2011 earthquake.

Rep. Chris Collins (R-NY) spoke in support of an earthquake early warning system. David Applegate from the U.S. Geological Survey (USGS) agreed and elaborated that there were very few fatalities from the actual Tōhoku earthquake that took place off the coast of Japan in 2011, because an earthquake early warning system was in effect. Dr. Applegate noted that there are plans for implementing an earthquake early warning system for the West Coast of the United States.

Rep. Peter DeFazio Introduces Legislation to Update 1872 Mining Law

Rep. Peter DeFazio (D-OR) introduced legislation intended to change the royalty structure for non-coal mining operations in the United States. The proposal aims to update the 1872 Mining Law, the long-lasting legislation that governs hardrock mining in the United States.

Under the proposed legislation, an eight percent royalty on gross revenue would be applied to new mines and a four percent royalty would be assessed to existing mines. Mining companies currently pay no royalties on metals, such as gold and silver, mined on federal lands. Rep. DeFazio, Ranking Member of the House Committee on Natural Resources, said the bill would require mining companies to pay taxes on minerals extracted from public lands, something mining companies have not had to do under the 1872 Mining Law.

The royalties collected would fund mine reclamation projects. The Bureau of Land Management (BLM) currently requires that mining companies pay fees, called bonding requirements, to cover future cleanup costs, but the Government Accountability Office issued a report stating that these bonding requirements frequently prove insufficient.

The National Mining Association (NMA) expressed skepticism toward the legislation, pointing out the $30 billion in taxes that the mining industry pays every year. NMA also voiced concern on the effect of increased royalties on mining companies, warning that such actions may drive down investment in the mining industry.

The legislation also seeks to make it easier for state and local governments to declare certain areas as "off-limits" for mining in order to protect drinking water, wildlife habitat, and historic resources.

House Committee Questions Bureau of Land Management on Implementation of Helium Stewardship Act

On July 15, 2014 the House Natural Resources Subcommittee on Energy and Mineral Resources (NRSEMR) held an oversight hearing to examine the implementation of the Helium Stewardship Act of 2013 (HSA). The hearing focused on efforts undertaken by the Bureau of Land Management (BLM) to ensure that taxpayers receive fair value for federal helium resources mined/refined.

Under the HSA, helium refiners are required to report excess refining capacity to the BLM, as well as refine, or toll, crude helium for other non-refiners. This tolling would have to occur

Government Update *continued on page 54*

Government Update continued from page 53

at what the legislation calls "commercially reasonable rates." Chairman Doug Lamborn (R-CO) said that this legislation represents a change in the long-standing policy, whereby BLM would collaborate with an exclusive group of refiners and sell the federal resource at below-market prices, as well as actively deny non-refiners access to helium pipelines.

Rep. Bill Flores (R-TX) said that he wants to see more work from the agency to guarantee access to the pipelines for non-refiners, while Rep. Matt Cartwright (D-PA) expressed concern regarding the ability of BLM to ensure that refiners accurately report excess refining capability. Linda Lance, Deputy Director of Programs and Policy at the BLM, replied that the BLM has issued forms defining excess refining capacity and affirmed the agency's commitment to providing access to the pipelines and effectively implementing the HSA.

Committee Chairman Doc Hastings (R-WA) and Rep. Lamborn plan to introduce a discussion draft of legislation, the American Helium Security Act of 2014 that will secure and encourage future production of domestic helium and create a federal leasing program for helium on federal lands.

NASA Launches Satellite Aimed at Measuring Carbon Dioxide Levels

On the morning of July 2, 2014 NASA launched a satellite tasked with measuring the global distribution of carbon dioxide. The Orbiting Carbon Observatory-2 (OCO-2), NASA's first successfully launched spacecraft dedicated to studying carbon dioxide in the atmosphere, was sent into orbit after a one-day delay. NASA's previous attempts to launch similar satellites, OCO and Glory, each resulted in launch failures.

Following a three-week calibration process, OCO-2 will begin collecting millions of samples uniformly distributed across the atmosphere, land, and water of Earth. This data will enable researchers to determine more precisely the sources of carbon dioxide in the atmosphere and the location of carbon sinks, areas that absorb carbon dioxide emissions.

NASA scientists have highlighted the importance of measuring global carbon dioxide levels and locating global carbon sources and sinks. Dr. David Crisp, principal director for the OCO-2 mission, stated that more accurate measures of carbon sinks, along with carbon sources, will enable regulators and industry to better manage carbon dioxide levels. Dr. Michael Frelich, Director of NASA's Earth Sciences Division, stated that OCO-2 will lay the foundation for more informed policy decisions on climate change.

The mission, which is planned to last for at least two years, will provide its first estimates of global carbon dioxide concentrations in early 2015.

AGI Geoscience Policy Monthly Review (August 2014)

House Forms Bipartisan Caucus to Bring Attention to Arctic Policy

Rep. Rick Larsen (D-WA) and Rep. Don Young (R-AK) recently announced the formation of a new bipartisan caucus designed to bring more attention to Arctic issues in Congress. The caucus, called the Congressional Arctic Working Group (CAWG), also aims to secure U.S. interests in the region.

The move to create the caucus comes a year before the United States prepares to take over the chairmanship of the Arctic Council in 2015. The Council serves as a voluntary intergovernmental organization of Arctic States and indigenous groups who work together to address economic and environmental needs relating to the Arctic. The caucus intends to improve the effectiveness of U.S. involvement in the Council in the wake of a report from the Government Accountability Office (GAO) highlighting the United States' lack of a clear strategy and resources for the Council.

Rep. Larsen stressed the need for the United States to shift focus to the Arctic, pointing out that other countries have already begun successfully navigating the Arctic waters for research and economic purposes. Rep. Young echoed those sentiments and emphasized the need to consider Alaskan Native priorities.

Congress most recently considered Arctic policy in a House Transportation Committee hearing titled "Implementing U.S. Policy in the Arctic," and in a bill introduced by Rep. Jim Sensenbrenner (R-WI) that would establish an Ambassador at Large for Arctic Affairs.

White House Releases Report on Costs of Delaying Climate Change Action

The White House Council of Economic Advisers (CEA) released a report examining possible economic consequences of delaying policies addressing climate change. The report, titled "The Cost of Delaying Action to Stem Climate Change," stresses the need for immediate policy action and looks at the net costs of postponing any action.

The CEA points out that the previous decade was the warmest on record, both in the United States and globally, and notes an average sea level rise of 1.25 inches per decade. In addition, the report suggests the impact of climate change on weather events may lead to more frequent and intense heat waves as well as larger rainfall events.

According to the report, climate change action would serve as an "insurance policy" against catastrophic consequences, such as coastal erosion and extreme weather events. Without these steps, the CEA estimates average temperatures will continue to rise and the global cost of climate change will reach $150 billion per year and continue rising as reversing temperature increases becomes more difficult.

The United Nations has hosted a climate summit in September 2014 to discuss opportunities to accelerate climate action and build political will for policy change.

Western Democrats Introduce Water Bill to Address Drought Crisis

On July 31, 2014 a group of Democrats from Western states introduced the Water in the 21st Century Act, which includes a number of programs intent on conserving and managing diminishing water supplies in drought-stricken states. A twin bill was introduced concurrently in the Senate by California Senators Barbara Boxer and Dianne Feinstein and in the House by Representatives Grace Napolitano (D-CA) and Peter DeFazio (D-OR).

The bill would establish Drought Resilience Guidelines for state and local agencies and new grant programs for local water system upgrades, as well as regional infrastructure projects. The legislation would also increase funding for data and research and expand the Environmental Protection Agency (EPA) WaterSense program, which promotes water-conserving products, buildings, and landscaping. ■

HGS *Bulletin* Instructions to Authors

All materials are due by the 15th of the month, 6 weeks before issue publication. Abstracts should be 500 words or less; extended abstracts up to 1000 words; articles can be any length but brevity is preferred as we have a physical page limit within our current publishing contract. All submissions are subject to editorial review and revision.

Text should be submitted by email as an attached text or Word file or on a clearly labeled CD in Word format with a hardcopy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator or Adobe Photoshop. Files should be saved and submitted in .ai, .eps, .tif or .jpg format. Send them as separate attachments via email or CD if they are larger than 5 MEGs each, accompanied by figure captions that include the file name of the desired image. DO NOT EMBED them into your text document; they must be sent as separate files from the text. DO NOT USE POWERPOINT, CLIP ART or Internet images (72-DPI resolution) as these do not have adequate resolution for the printed page and cannot be accepted. All digital files must have 300-DPI resolution or greater at the approximate size the figure will be printed.

Photographs may be digital or hard copy. Hard copies must be printed on glossy paper with the author's name, photo or figure number and caption on the back. Digital files must be submitted in .tif, .jpg or .eps format with 300-DPI or greater resolution at the printing size and be accompanied by figure captions that are linked by the file name of the image. The images should be submitted as individual email attachments (if less than 5 MB) or on CD or DVD.

Advertising

The *Bulletin* is printed digitally using InDesign. Call the HGS office for availability of ad space and for digital guidelines and necessary forms or email jill@hgs.org. Advertising is accepted on a space-available basis. **Deadline for submitting material is 6 weeks prior to the first of the month in which the ad appears.**

Random Inside Ad Placement Black & White Prices Shown Color add 30% to prices shown below					Specific Page Color Ad Placement					
No. of Issues	Random Eighth Page	Random Quarter Page	Random Half Page	Random Full Page	Inside Front Cover Full Page	Inside Back Cover Full Page	Page 2 Full Page	Outside Back Cover Half Page	Back of Calendar Full Page	Calendar Quarter Page
10	$823	$1,387	$2,488	$4,734	$7,830	$7,560	$7,384	$6,858	$6,750	$2,700
9	$823	$1,387	$2,488	$4,734						
8	$750	$1,260	$2,242	$4,307						
7	$665	$1,123	$2,014	$3,834						
6	$590	$990	$1,782	$3,392						$1,890
5	$497	$837	$1,503	$2,860	$4,698	$4,536	$4,466	$4,104		
4	$405	$683	$1,223	$2,326						
3	$327	$550	$990	$1,886						$1,080
2	$232	$392	$704	$1,339						
1	$146	$246	$443	$842	$1,404	$1,296	$1,313	$1,080	$1,296	$810
Professional Directory Section Business Card Ad 10 Issues – $160 ($30 for each additional name on same card)										

Website Advertising Opportunities

HGS has multiple website advertising opportunities for your company! We've expanded our offerings to include a 275 x 800 pixel, rotating banner ad on the front page of the website. We have kept the popular Event Calendar and Geo-Job Postings advertisement locations!

	Home page Banner	Home Page (200 x 400 pixels)	Event Calendar (200 x 400 pixels)	Geo-Jobs (120 x 90 pixels)	Website Business Card (Members Only)	Personal Resumes (Members Only)
One year	$3,000.00	$2,800.00	$2,500.00	$1,400.00	Free	Free
6 months	$2,000.00	$1,800.00	$1,500.00	$750.00	Free	Free
3 months	$1,500.00	$1,300.00	$1,000.00	$450.00	Free	Free
Monthly	$ 700.00	$500.00	$ 400.00	$200.00	Free	Free

We still offer Geo-Jobs - where your company can post job openings for 14 days at $50.00 or 30 days at $100.00.

For more information regarding website advertising visit HGS.org or email jill@hgs.org.

Application to Become a Member of the Houston Geological Society

Qualifications for Active Membership

1) Have a degree in geology or an allied geoscience from an accredited college or university; or
2) Have a degree in science or engineering from an accredited college or university and have been engaged in the professional study or practice of earth science for at least five (5) years.

Qualifications for Associate Membership (including students)

1) Be involved in the application of the earth or allied sciences.
2) Be a full-time student enrolled in geology or in the related sciences.

Apply online at www.hgs.org and click on Join HGS

Annual Dues Expire Each June 30. (Late renewals – $5 re-instatement fee)
Annual dues are $28.00; emeritus members pay $14.00; students are free.

Mail this application and payment to:
Houston Geological Society
14811 St. Mary's Lane, Suite 250 • Houston, TX 77079-2916
Telephone: 713-463-9476 Fax: 281-679-5504

Payment method:

☐ Check, ☐ VISA, ☐ MasterCard, ☐ American Express, ☐ Discover

Card # _____

Expiration Date: _____ Card I.D. _____

(Card I.D. – 3 or 4 digit number on front or back of card)

To the Executive Board: I hereby apply for ❑ Active or ❑ Associate membership in the Houston Geological Society and pledge to abide by its Constitution and Bylaws. ❑ Check here if a full-time student.

Name: _____

Address: _____

_____

Home Phone: _____ *Spouse's Name:* _____

Email: _____

Job Title: _____

Company: _____

Company Address: _____

_____

Work Phone: _____ *Fax Number:* _____

Circle Preferred Mailing Address: Home Office

Professional Affiliations: _____

❑ AAPG member No.: _____

Professional Interest:

❑ Environmental Geology
❑ International E&P
❑ North American E&P (other than Gulf Coast)
❑ Gulf Coast E&P (onshore & offshore)

School _____

Degree _____ *Major* _____ *Year* _____

_____

School _____

Degree _____ *Major* _____ *Year* _____

Earth Science Work Experience _____

_____

_____

_____

Applicant's Signature _____ *Date* _____

Endorsement by HGS member (not required if active AAPG member)

Name: _____

Signature _____ *Date* _____

Membership Chairman _____ *HGS Secretary* _____

revised 7/30/14

Houston Petroleum Auxiliary Council News

Janet Steinmetz, 281-531-7204

ATTENTION ALL HUSBANDS! Please share this article with your wife. All spouses of geologists, geophysicists, landmen and engineers are invited to join HPAC, an organization designed especially for you.

This month I would like to introduce you to the president of HPAC, **Sally Blackhall**.

Sally received a BA degree in History and Sociology from Lamar University. After graduating, her first employer was Southwestern Bell. She applied to work in employee relations. Southwestern Bell had a policy that anyone working in that department had to be familiar with all departments. She was given a battery of tests and excelled in mechanics. Seems she was very artistic in the mechanical sense. She was placed in Engineering and began a career in drafting. The job was to create drawings for new services such as new subdivisions, apartments, and malls. She liked it so much that she never transferred to any other department.

Early on Sally decided her earning ability was greater with drafting, and drafting was more enjoyable than teaching History at the secondary level. Later, she had jobs in oil and gas drafting with Texas Gulf Sulfur Company, Belco Petroleum, Union Oil of California and Melon Energy.

Sally met her husband, Ray Blackhall in 1978 when they worked in the same building in Saint James Place. She was working for Melon Energy, Ray by Santa Fe Energy. Ray became an independent in 1979 when he and a partner formed Subsurface Resources, Inc. Sally worked at Melon Energy by day and moonlighted at night for Ray. Ray and his partner acquired a retainer with Anadarko Petroleum. Then Sally left her job at Melon Energy to start her own successful contract drafting business, Cartographics, in 1980. She and Ray were married that same year. She maintained her separate business while also doing the maps and brochures for Ray.

Sally joined the Houston Geological Auxiliary but was not active until after she began working from home. Ray's first success came in 1981, and they have been fairly successful since then. After their son Colin was born in January 1987, Sally worked from home. Ray ended his partnership and sold all Subsurface Resources' production in 1990. Sally phased out Cartographics in 1991, and Ray formed Cosara Energy Company. He created the name by combining Colin, Sally and Ray. Sally became executive manager for Cosara. They still worked onshore Gulf Coast Texas and SW Louisiana.After twenty-five years in business, Cosara is still going strong with several active projects. She is proud to say that it is well-known and respected in the Houston oil and gas industry. They have spent their entire careers in Houston working onshore Texas and SW Louisiana with a lot of their production within 100 miles of Houston.

Then Sally became interested in gardening and community affairs and joined the Women's Club and Garden Club in Champion Forest. She chaired the Women's Club Christmas charity auction and served as Garden Club president from 2011-2013. She is also a member of the Northwest Forest Republican Women. She has volunteered and co-chaired spouse events at several conventions for AAPG, GCAGS, and GSA. She served as president of HGA in 2006-07, and we are honored that she is currently the president for HPAC.

Thanks, Sally, for all your service.

Now, for the HPAC News: November is here, and the busy-ness of the season will soon be upon us. The members of HPAC will be in on all the festivities.

First, we want to thank **Martha Lou Broussard** and **Linnie Edwards** for organizing the informative and fun trip to the George Bush Library in College Station. The day was capped off with a delicious lunch and a visit to the Messina Hof Winery. As usual, a good time was had by all. We look forward to the next trip.

Everyone is invited to join the **Book Club** on November 3 at the home of **Phyllis Carter**. We will be discussing Daniel Brown's *The Boys in the Boat: Nine Americans and their Epic Quest for Gold at the 1936 Olympics*. For more information please call **Mickey Murrell** at 281-469-2272. The more people there, the better. Upcoming books include *Mrs. Lincoln's Dressmaker, The Goldfinch*, and *The Invention of Wings*.

Our **Christmas Luncheon** is always a high point of the year. This year is no exception. On December 15 Elvis will be joining us! This is an event you don't want to miss. Under the guidance of **Shirley Gordon** the Junior League will be dressed up in its holiday finest, and we hope you will be there too.

The Bridge groups are going strong: **Cinco Mas Bridge** under the leadership of **Audrey Tompkins** (713-686-0005) and **Petroleum Club Bridge** with **Daisy Wood** (832-581-3231). Everyone is welcome. Call for details.

Be sure to mark your 2015 calendar for **Game Day** on March 17 at BraeBurn Country Club. Something tells me there will be a St. Patrick's Day theme. **Daisy Wood** never disappoints us. We will finish off the year on May 14 with our annual Luncheon and Style Show at Maggiano's Little Italy. **Kathi Hilterman** is already at work. We are eager to see the fashions presented by "It's All About You".

We are always on call to assist HGS in any way we can. If you are interested in helping at the HGS office or in any other capacity, please call **Janet Steinmetz**, 281-531-7204. We want to be there for them when the need arises.

If you have not already done so, please send in the HPAC membership form to **Susan Bell**, 11431 Legend Manor, Houston, TX 77082. Please include your name, address, your husband's name and affiliation, your telephone number and a check for $20.

We look forward to seeing you. ■

GeoWIVES – News from President, **Daisy Wood**, 832-581-3231

Daisy Wood is pleased to announce that her GeoWives group, which includes wives of retired and deceased Geologists and Geophysicists, is still very active, enjoying gatherings and camaraderie.

Membership renewal letters have been forwarded to all GeoWives members informing them of the year's events and introducing the 2014-2015 Board, which is as follows:
Daisy Wood, *President*;
Linnie Edwards, *Vice-President*;
Norma Roady, *Treasurer*.

Recently, on October 2, the members enjoyed a lavish and special Luncheon and Fashion Show at the Petroleum Club. The clothes paraded were the latest Autumn/Winter creations presented by Doncaster Boutique.

The members are now very excited and looking forward to the next event which will take place on December 5, 2014 at the Petroleum Club. To celebrate Christmas they will be welcomed by the Madrigal Singers and then, in addition to an incomparable, delicious luncheon, they will be able to purchase and stock their Christmas gifts from 22 of the best Houston vendors at the so called "Market".

If you are interested in knowing more about GeoWives, please call Daisy. ■

You are invited to become a member of

HPAC

2014–2015 dues are $20.00 Mail dues payment along with the completed information

to **Susan Bell** • 11431 Legend Manor • Houston, Texas 77082

YEARBOOK INFORMATION

Last Name	First Name	Name Tag
Spouse Name	Company	
Street Address	City State	Zip
Email Address	Home Fax	
Home Phone	Cell Phone (Optional)	Home Email Address

Please choose a committee assignment if you are interested.

☐ Fall Event ☐ Yearbook ☐ Bridge ☐ Membership

☐ Christmas Event ☐ Spring Event ☐ Notification ☐ Book Club

☐ Exploring Houston ☐ Courtesy

WELLSITE GEOSCIENCE SERVICES

When time is money, Wellsite Geoscience is money well spent.

Whether you're exploring a basin, producing a well or completing a shale play, time is money. That's why Weatherford Laboratories brings a suite of formation evaluation technologies right to the wellsite. Utilizing mud gas and cuttings, these technologies provide detailed data on gas composition, organic richness, mineralogy and chemostratigraphy in near real time. As a result, operators now have an invaluable tool to assist with sweet spot identification, wellbore positioning, completion design and hydraulic fracturing. We call it Science At the Wellsite. You'll call it money well spent.

SCIENCE AT THE WELLSITE™

www.weatherfordlabs.com

Formation Evaluation | Well Construction | Completion | Production

Weatherford
LABORATORIES

HOUSTON
GEOLOGICAL SOCIETY
14811 St. Mary's Lane, Suite 250 • Houston, TX 77079

Periodicals
U.S. Postage
PAID
Houston, Texas